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Ship Building on the Lakes

The shipyards of the great lakes have 29 vessels under construction for 1909 delivery, including 11 bulk freighters, two package freighters, six passenger boats, five lighters, two tugs, one ferry, one survey boat and one drill boat. Of this program the American Ship Building Co. is building seven, the Great Lakes Engineering Works, 11; the Toledo Ship Building Co., two; the Manitowoc Dry Dock Co., three; Johnston Bros., three; Collingwood Ship Building Co., two; and the Empire Ship Building Co., one.

Again subdividing the program, the American Ship Building Co.'s new construction consists of five bulk freighters for the ore trade, one bulk freighter for the stone trade and a small passenger boat. This little passenger boat is to ply around Put-in-Bay and will have the engines of an existing yacht installed on her.

The Great Lakes Engineering Works have under construction four freighters for the ore trade, two package freighters, one passenger ferry and four lighters. One of these bulk freighters, the Theodore H. Wickwire, has already been launched.

The Toledo Ship Building Co. is building one bulk freighter and one passenger boat; the Manitowoc Dry Dock Co., one excursion steamer one lighter and one survey boat; the Collingwood Ship Building Co., two passenger boats; Johnston Bros., two tug boats and one passenger steamer; the Empire Ship Building Co., one drill boat. Of this program the Toledo Ship Building Co. has already delivered its passenger steamer, having constructed it in the phenomenal time of 76 working days, the particulars of which will be found elsewhere in this issue. The Collingwood Ship Building Co. has also launched the passenger steamer Hamonic, and Johnston Bros. have launched the tug Francis B. Hackett.

While this is a small ship building program

compared with that of the past three or four years, it is nevertheless quite respectable. Moreover, additional contracts are pending. These 11 bulk freighters have a capacity of 101,400 gross tons of ore in a single trip or 2,028,000 in an average season of 20 trips.

It will be observed in the launching table published elsewhere that 24 bulk freighters were put overboard in 1908, having a capacity of 204,700 tons on a single trip or 4,094,000 tons in an average season of 20 trips. In the past seven years vessels having a gross capacity of 33,867,200 tons have been added to the available ore carrying fleet. The 1909 program will increase this 35,895,200 tons, which is 10,000,000 tons greater than the total movement of ore during 1908 and is greater than the movement of ore in any year save two—1906, when 38,522,239 tons were moved, and 1907, when 42,245,070 tons were moved.

Four steel-making companies figure in the 1909 program of vessel construction—the United States Steel Corporation with two great steamers, the Wickwire Steel Co., with two, the LaBelle Iron Works one, and the Snyder interests one. The others are for independent interests.

Altogether 39 vessels were launched during 1908, of which number there were 24 bulk freighters, three passenger boats, one package freighter, one Canadian canal freighter, three tugs, three fire boats, two drill boats, one lightship, and one sandsucker and one supply boat.

The shipyards have not the usual amount of repair work on hand. Ordinarily at this time of the year vessels are lying in the slips awaiting their turn for necessary repairs, but as only 60 per cent of the fleet was in commission during the year, repairs have suffered a corresponding reduction, and are probably about 40 per cent less than usual. Probably later in the winter this condition may be offset somewhat by the fact that a number of ships which did not get out at all last spring will need more than the usual amount of attention before they go into commission.

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VESSELS UNDER CONSTRUCTION IN GREAT LAKES SHIP YARDS FOR 1909 DELIVERY.

AMERICAN SHIP BUILDING CO.'S YARDS.													
To be built at	Type or Name	Dimensions in ft.				No. of Hatches	Spaced Centers, ft.	Dimensions of Engines	Boilers, dimensions in feet and inches	Draft	Steam Pressure, Pounds	Capacity, Gross Tons	For whom building
		Over all	Keel	Beam	Depth								
Lorain	Bulk Ftr. Alva	600	580	58	32	34	12	24, 39, 65-42	2 Scotch 16x11.6	Ellis & Eaves	170	12,000	Pittsburg S. S. Co., Cleveland, O.
Lorain	C. Dinkey Bulk Ftr. E. J.	600	580	58	32	34	12	24, 39, 65-42	2 Scotch 11x11.6	Ellis & Eaves	170	12,000	Pittsburg S. S. Co., Cleveland, O.
Lorain	Buffington	600	580	58	32	34	12	24, 39, 65-42	2 Scotch 14½x11½	Ellis & Eaves	170	12,000	Pittsburg S. S. Co., Cleveland, O.
Lorain	Bulk Ftr.	524	504	54	30	30	12	23½, 38, 63-42	2 Scotch 14½x11½	Ellis & Eaves	180	9,500	La Belle Iron Works, Steubenville, O. (M. A. Hanna & Co., Mgrs.)
Cleveland	Bulk Ftr.	400	380	52	28	19	12	21, 33½, 57-42	13.9x11.6	Ellis & Eaves	180	7,000	R. P. Ranney
Wyandotte	Bulk Ftr.	374	356	47	26	18	12	17½, 25½, 37, 54-36	13.2x11.6	Howden	210	5,000	Michigan Alkali Co., Detroit, Mich.
Lorain	Bulk Ftr. Jno. J. Barlum	524	504	54	30	30	12	23½, 38, 63-42	2 Scotch 14½x11½	Ellis & Eaves	180	9,500	Postal S. S. Co., Detroit, Mich.
Cleveland	Pass. Str.	85	78	18	8								E. J. Dodge, Sandusky
GREAT LAKES ENGINEERING WORKS, DETROIT, MICH.													
Ecorse	Bulk Ftr. T. H. Wickwire	464	444	56	23	13	24	22½, 36, 60-42	13.9x12.0	Forced	180	8,300	American S. S. Co.
Ecorse	Bulk Ftr. C. F. Moll	464	444	56	23	13	24	22½, 36, 60-42	13.9x12.0	Forced	180	8,300	American S. S. Co.
Ecorse	Ltr. Ulster	125		32	8.6			Steel Lighter	No power				Dunbar & Sullivan Dredge Co.
Ecorse	Ltr. Munster	125		32	8.6			Steel Lighter	No power				Dunbar & Sullivan Dredge Co.
Ecorse	Ltr. Leinster	125		32	8.6			Steel Lighter	No power				Dunbar & Sullivan Dredge Co.
Ecorse	Connaught	125		32	8.6			Steel Lighter	No power				Dunbar & Sullivan Dredge Co.
Ecorse	Pkg. Ftr.	372	350	46	30	10	24	19, 27½, 40, 58-42	11.6x11.6	Forced	210	5,000	Mutual Terminal Co.
St. Clair	Pkg. Ftr.	372	350	46	30	10	24	19, 27½, 40, 58-42	11.6x11.6	Forced	210	5,000	Mutual Terminal Co.
Ecorse	Bulk Ftr. 605	5	580	58	32	35	12	24, 38, 65-42	16x12	Forced	180	12,000	Shenango Furnace Co.
Ecorse	Ferry	151		48	9			25, 44-72	12x11.11	Natural	120	1,500	Bay Transportation Co.
Ecorse	Bulk Ftr.	500	480	56	20		12	22½, 36, 61-42	14.2x12	Forced	180	9,500	Inland Navigation Co.
TOLEDO SHIP BUILDING CO., TOLEDO, O.													
Toledo	Passenger Wauketa	185	175	38	4	14		17½, 27½, 43-30	3-10.8x11.6	Natural	180		White Star Line
Toledo	Freighter	400	440	56	24	24	12	22½, 36, 60-42	2-14.6x11.6	Ellis & Eaves	180	8,300	R. P. Ranney
COLLINGWOOD SHIP BUILDING CO., LTD., COLLINGWOOD, ONT.													
Collingwood	Pass. Str. Hamonic	365	341	50	35	8	24	One Quad. -24, 35, 52, 40-42	6-12.6x11	18'	250	3,000	Northern Navigation Co., Ltd.
Collingwood	Pass. Str.	142	135	25	9			Two Triples -10, 16½, 21-15	1-12 6x10.6	6'	150		Northern Navigation Co., Ltd.
MANITOWOC DRY DOCK CO., MANITOWOC, WIS.													
Manitowoc	Ex. Str. United States	215	200	40	17			22, 36½, 60-40	3-13 3x12.4 Scotch	Forced Exhaust	170	1,298	Indiana Trans. Co., Michigan City
Manitowoc	Lighter	140	132	36	15			16, 18-16	Loco. 7x21.9		150	401	Chicago Lighterage Co., Chicago
Manitowoc	Survey Boat	100	92	20	10			16, 33-24	Scotch 11x11.6	Natural	150		U. S. Gov't Engineers, Milwaukee
JOHNSTON BROS., FERRYSBURG, MICH.													
Ferrysburg	Tug Francis B. Hackett	108	96	24½	14½			20, 40-30	10.6x14	Natural	140		Hackett Towing & Wrecking Co., Amherstburg, Ont.
Ferrysburg	Tug	76	67	14.4	7.6			14-16	7.6x11	Natural	150		Ranney Fish Co., Cleveland, O.
Ferrysburg	Pass. Str.	150	138	28	11	6	1	18 40-30	2-6.6x12	Natural	150		Geo. L. Craig, Toledo, O.
EMPIRE SHIPBUILDING CO.													
Buffalo	Drill Boat	140	131	32									Empire Engineering Corporation

The steamers City of Buffalo and City of Erie of the Cleveland & Buffalo Line are under extensive repairs in the way of repainting, redecorating, overhauling and the carpenter and joiner work. About 250 men are employed on the ships. The work is being done by the steamship company under departments established for such work. The Detroit & Buffalo Line boats will also undergo an extensive refitting. They will be redecorated and all the furniture will

be reupholstered and refinished. New carpets will be put in the main cabin and second gallery.

Kruse & Banks, North Bend, Ore., have during 1908 built a number of craft, among which are the following: Steamer Fairhaven, for J. E. Davenport, of San Francisco, Cal.; length over all, 190 ft.; value, \$90,000; 650 gross tons; triple expansion engine of 450 H. P. and one Scotch

marine boiler. Steamer Fifield, for A. F. Estabrook, of San Francisco, Cal.; length over all, 185 ft.; value \$95,000; 600 gross tons; twin screw engines of 225 H. P. each and two Scotch marine boilers, supplied by the Marine Iron Works, Chicago, Ill. Power boat Wehilimena, for Charles Thom, of North Bend, Ore.; length over all, 95 ft.; value, \$25,000; 80 gross tons; twin gas engines of the Fairbanks-Morse type, of 75 H. P. each.

United States Naval Program

There are 45 ships building for the United States navy as against 29 a year ago. During the year the following warships have gone into commission: Battleships Mississippi, Idaho, New Hampshire; armored cruisers, North Carolina, Montana; scout cruisers, Chester, Birmingham and Salem, submarine torpedo boat Octopus; total of nine. Twenty vessels are therefore continued from last year's construction, making the new construction 25 vessels. New construction includes the battleships Florida and Utah, the torpedo boat destroyers Paulding, Drayton, Roe, Ferry, Perkins, Sterrett, McCall, Burrows, Warrington, Mayrant; submarine boats Carp, Baracuda, Pickerel, Skate, Shipjack, Sturgeon, Thrasher and Tuna; colliers Jupiter, Cyclops, Vulcan, Mars and Hector.

The 45 warships under construction embrace six battleships, 15 torpedo boat destroyers, 15 submarines, seven colliers and two tug boats. Omitting the submarines, these ships represent a displacement of 176,850 tons, horsepower of 326,320, and monetary value, exclusive of armor

and armament, of \$40,082,800. The two battleships Florida and Utah, one of which is to be built at the New York navy yard and the other at the yard of the New York Ship Building Co., Camden, N. J., are to have Parsons turbines. All of the destroyers are also to be equipped with turbines.

The coast shipyards are reasonably busy with coast work, though as usual are not building anything for the foreign trade. There is reason to believe, however, that this condition will be shortlived. The Ocean Mail bill was passed by the senate last year and came within three or four votes of its passage through the house. Even those most hostile to it after the last session have manifested a better feeling towards the bill and there is now good reason to believe that it will be passed before next March. The bill merely seeks to extend the ocean mail service of the United States to South American ports and to quarters not now visited by American steamers. It is a very moderate measure, intended to be entirely supported from postal revenues, but modest as it is, its passage will greatly stimulate shipbuilding.

Vessels Under Construction for the United States Navy.

Name.	By whom and where building.	Contract date of completion.	Dimensions ft., in. Normal condition.			Displacement (normal).	I. H. P. (esti- mated.)	Speed knots (estimated).	Type of engine.	Type of boilers.	Contract price of hull and machinery.
			Length between perpen- diculars.	Breadth on L. W. L.	Mean draught						
Battleships.											
South Carolina	Cramp & Sons, Philadelphia, Pa.	Dec. 21, 1909	450	80	24 6	16,000	16,500	18 1/2	Trip.exp., twin screw	Bab. & Wil...	\$3,540,000
Michigan	New York S. B. Co., Camden, N. J.	Nov. 20, 1909	450	80	24 6	16,000	16,500	18 1/2	Trip.exp., twin screw	Bab. & Wil...	3,585,000
Delaware	Newport News Co., Newport News	Aug. 6, 1910	510	85	26 11	20,000	25,000	21	Trip.exp., twin screw	Bab. & Wil...	3,887,000
North Dakota	Fore River Co., Quincy, Mass.	June 21, 1910	510	75	26 11	20,000	25,000	21	Twin screw, turbine.	Bab. & Wil...	4,377,000
Florida	Navy Yard, New York		510	88	28 6	21,825	228,000	20 1/2	Parsons Turbines	Water tube	4,600,000
Utah	New York S. B. Co., Camden, N. J.	July 24, 1911	510	88	28 6	21,825	228,000	20 1/2	Parsons Turbines	Water tube	3,946,000
Torpedo Boat Destroyers.											
Smith	Cramp & Sons Philadelphia	Oct. 10, 1909	289	26	8	700	10,000	28	Three screw, turb.	Mosher	585,000
Lamson	Cramp & Sons, Philade.lphia	Oct. 10, 1909	289	26	8	700	10,000	28	Three screw, turb.	Mosher	585,000
Preston	New York S. B. Co., Camden, N. J.	Sep. 28, 1909	289	26	8	700	10,000	28	Three screw, turb.	Theracraft	645,000
Flusser	Bath Iron Works	Sep. 28, 1909	289	26	8	700	10,000	28	Three screw, turb.	Normand	624,000
Reld	Bath Iron Works	Sep. 28, 1909	289	26	8	700	10,000	28	Three screw, turb.	Normand	624,000
Paulding	Bath Iron Works	Sep. 29, 1910	289	26	11 1/2	742	112,000	29 1/2	Three screw, turb.	Water tube	644,000
Drayton	Bath Iron Works	Sep. 29, 1910	289	26	11 1/2	742	112,000	29 1/2	Three screw, turb.	Water tube	644,000
Roe	Newport News S. B. Co.	Oct. 12, 1910	289	26	11 1/2	742	112,000	29 1/2	Three screw, turb.	Water tube	620,000
Terry	Newport News S. B. Co.	Oct. 12, 1910	289	26	11 1/2	742	112,000	29 1/2	Three screw, turb.	Water tube	620,000
Perkins	Fore River Ship Bldg. Co.	Sep. 1, 1910	289	26	11 1/2	742	112,000	29 1/2	Twin screw, turb.	Water tube	610,000
Sterrett	Fore River Ship Bldg. Co.	Oct. 1, 1910	289	26	11 1/2	742	112,000	29 1/2	Twin screw, turb.	Water tube	610,000
McCall	New York S. B. Co.	Oct. 5, 1910	289	26	11 1/2	742	112,000	29 1/2	Three screw, turb.	Water tube	665,000
Burrows	New York S. B. Co.	Oct. 5, 1910	289	26	11 1/2	742	112,000	29 1/2	Three screw, turb.	Water tube	665,000
Warrington	Wm. Cramp & Sons	Oct. 1, 1910	289	26	11 1/2	742	112,000	30	Twin screw, turb.	Water tube	664,000
Mayrant	Wm. Cramp & Sons	Oct. 1, 1910	289	26	11 1/2	742	112,000	30	Twin screw, turb.	Water tube	664,000
Submarines.											
No. 13 Stingeray	Fore River Ship Bldg. Co.										
No. 14 Tarpon	Fore River Ship Bldg. Co.										
No. 15 Bonita	Fore River Ship Bldg. Co.										
No. 16 Snapper	Fore River Ship Bldg. Co.										
No. 17 Narwhal	Fore River Ship Bldg. Co.										
No. 18 Grayling	Fore River Ship Bldg. Co.										
No. 19 Salmon	Fore River Ship Bldg. Co.										
Carp											
Barracuda											
Pickerel											
Skate											
Shipjack											
Sturgeon											
Thrasher											
Tuna											
Colliers.											
Vestal	Navy Yard, New York		450	60	1 26	12,585	7,500	16	Trip.exp., twin screw	Bab. & Wil...	\$1,550,000
Prometheus	Navy Yard, Mare Island		450	60	1 26	12,585	7,500	16	Trip.exp., twin screw	Bab. & Wil...	\$1,550,000
Jupiter	Navy Yard, Mare Island										
Cyclops											
Vulcan	Maryland Steel Co., Sparrow's Point, Md.		385	53	24 6	11,200		12	Trip.exp., twin screw	Scotch	479,600
Mars	Maryland Steel Co.		385	53	24 6	11,200		12	Trip.exp., twin screw	Scotch	479,600
Hector	Maryland Steel Co.		385	53	24 6	11,200		12	Trip.exp., twin screw	Scotch	479,600
Tug Boats.											
Patapsco	Navy Yard, Portsmouth		148	29	0 1/2	755	1,160	13	Trip.exp., twin screw	Scotch	\$175,000
Patuxent	Navy Yard, Norfolk		148	29	0 1/2	755	1,160	13	Trip.exp., twin screw	Scotch	\$175,000

a Limit of cost.

b Shaft horse power.

Merchant Work in Coast Yards

Newport News Shipbuilding & Dry Dock Co., Newport News, Va.

Steel freight steamer for A. H. Bull & Co., of New York; length over all, 329 ft.; estimated gross tonnage, 2,800; triple expansion single screw engine of 1,500 H. P.; two cylindrical boilers.

Wooden tug for the Lamberts Point Towboat Co., Lamberts Point, Va.; length over all, 100 ft.; estimated gross tonnage, 150; engine to be taken from the tug Chesapeake is of 500 H. P.; one Scotch boiler, new.

Steel cable-laying steamer Joseph Henry for the United States war department; length over all, 167 ft.; estimated gross tonnage, 790; compound expansion twin screw engine of 1,000 H. P.

Steel passenger steamer Southland, for the Norfolk & Washington Steamboat Co., Washington, D. C.; length over all, 305 ft.; estimated gross tonnage, 2,000; single screw triple expansion engine of 3,000 H. P.; four Scotch boilers.

New York Shipbuilding Co., Camden, N. J.

Steel steamer Tahoma, for the United States revenue cutter service; length over all, 192 ft.; approximate value, \$225,000; estimated gross tonnage, 1,050; triple-expansion, single screw engine of 1,400 H. P.; two Babcock & Wilcox boilers.

Steel steamer Yamacraw for the United States revenue cutter service; length over all, 192 ft.; approximate value, \$225,000; estimated gross tonnage, 1,050; triple-expansion, single screw engine of 1,400 H. P.; two Babcock & Wilcox Scotch boilers.

Eight steel coal barges for the Lehigh Valley Railroad Co.; length over all, each 116 ft., 10 in.; approximate value, each, \$40,000; estimated gross tonnage, 2,070 each; one donkey boiler.

Three submarine mine planters for the United States Quartermaster's department; length over all, each, 165 ft.; displacement, 680 ft.; twin screw engine of 850 H. P.; two single ended Scotch boilers.

Two car floats for the New York Central & Hudson River R. R. Co.; length over all, each, 330 ft.; beam, each, 47 ft.; depth, each, 17.4 ft.; capacity 16 cars each.

Two car floats for the New York Central & Hudson River R. R. Co.; length over all, each, 257 ft.; beam, each, 38 ft.; depth, each, 10 ft.; capacity, 12 cars each.

Side wheel steamer Robert Fulton, for the Hudson River Day Line, New York; 346 ft. long over all; 42 ft. beam and 80 ft. beam over guards; 12.4 ft. deep; approximate value, \$375,000; estimated gross tonnage, 2,500; vertical beam side wheel engine of 3,000 H. P.; two locomotive boilers.

Fore River Ship Building Co., Quincy, Mass.

Steel tug General Robert Anderson for the United States War Department; length over all, 98 ft.; approximate value, \$58,500; compound single screw engine of 350 H. P.; one Scotch boiler.

Steel tug General Richard Arnold, for the United States War Department; length over all, 98 ft.; approximate value, \$58,500; compound single screw engine of 350 H. P.; one Scotch boiler.

Steel tug General R. B. Ayres, for the United States War Department; length over all, 98 ft.; approximate value, \$58,500; compound single screw engine of 350 H. P.; one Scotch boiler.

Steel tug General J. M. Brannan, for the United States War Department; length over all, 98 ft.; approximate value, \$58,500; compound single screw engine of 350 H. P.; one Scotch boiler.

Steel tug General Harvey Brown, for the United States War Department; length over all, 98 ft.; approximate value, \$58,500; compound single screw engine of 350 H. P.; one Scotch boiler.

Steel tug General G. W. Getty, for the United States War Department; length over all, 98 ft.; approximate value, \$58,500; compound single screw engine of 350 H. P.; one Scotch boiler.

Steel tug General R. H. Jackson, for the United States War Department; length over all, 98 ft.; approximate value, \$58,500; compound single screw engine of 350 H. P.; one Scotch boiler.

Steel tug General A. M. Randol, for the United States War Department; length over all, 98 ft.; approximate value, \$58,500; compound single screw engine of 350 H. P.; one Scotch boiler.

Six steel car floats for the New York, New Haven & Hudson River Railroad Co.; length over all, 327 ft. each; approximate value, \$330,000 each.

Steel transfer tug No. 22 for the

New York, New Haven & Hudson River Railroad Co.; length over all, 125 ft. 6½ in.; approximate value, \$100,000; estimated gross tonnage, 268; compound single screw engine of 800 H. P.; one Scotch boiler.

Maryland Steel Co., Sparrow's Point, Md.

Steel dredge Chester, for M. J. Dady, Brooklyn, N. Y.; length over all, 100 ft.; estimated gross tonnage, 200; no engine; one Scotch boiler.

Steel rock drill barge for Isthmian Canal Commission, Washington, D. C.; length over all, 112 ft.; estimated gross tonnage, 150; no engine; one Scotch boiler.

This company is also building three steel colliers for the United States navy, particulars of which will be found in the table of Vessels Under Construction for the United States Navy.

Pusey & Jones Co., Wilmington, Del.

Steel hull, twin screw steamer for submarine mine service for the United States Quartermaster's department; length on deck 165 ft.; fore and aft compound engines 17½ and 35 in. by 22 in.; two boilers of the Scotch type, each 11 ft. 9 in. in diameter by 12 ft. long, constructed for 150 pounds working pressure.

Steel hull steam schooner yacht, rigged, length over all, 177 ft. 6 in.; engines of the four-cylinder, triple expansion type; cylinders 14, 21 and 24 in., by 18 in. stroke; two boilers designed for a working pressure of 250 pounds.

Steel hull, double screw, double end type ferry boat, 100 ft. long, to be driven by two kerosene oil engines of 75 H. P. each.

Gas Engine & Power Co. and Charles L. Seabury & Co., Consolidated,

Morris Heights, N. Y.

Steel steam yacht 140 ft. in length, of 225 gross tons; triple expansion single screw engine of 700 H. P.; one Seabury water tube boiler.

Wooden steam yacht 137 ft. in length, of 123 gross tons; triple expansion twin screw engine of 2,000 H. P.; one Seabury water tube boiler.

Wooden gasoline yacht 111 ft. in length, of 70 gross tons; three Speedway gasoline engines for driving triple screws, 525 H. P.

This company also has under construction eleven gasoline launches aggregating 132 tons and 272 H. P., equipped with Speedway motors.

The machinery for the new steam-

er Hyak, building at the yard of Joseph Supple, Portland, Ore., is also being built by this company. It consists of a triple-expansion oil-burning engine, with cylinders 12, 19½ and 32 in. in diameter and with an 18-in. stroke. The boiler is of the Seabury water tube type with 3,000 sq. ft. of heating surface and 275 pounds working pressure. The installation will also include the condenser and some of the auxiliaries. The Hyak is a passenger and cargo steamer for service on Puget Sound. **Harlan & Hollingsworth Corporation, Wilmington, Del.**

Steam steel harbor lighter Keyport for the Manhattan Lighterage Co., of New York; length over all, 110 ft.; estimated gross tonnage 466; one single high pressure engine of 400 H. P.; one cylindrical boiler.

Steam steel harbor lighter Westfield for the Manhattan Lighterage Co., of New York; length over all, 110 ft.; estimated gross tonnage, 466; one single high pressure engine of 400 H. P.; one cylindrical boiler.

Steel freight steamer G. T. No. 1, for the Central of Vermont Transportation Co., Montreal, Can.; length over all, 295 ft.; gross tonnage, 2,680; one triple expansion single screw engine of 2,000 H. P.; three cylindrical boilers.

Steel freight steamer G. T. No. 2, for the Central of Vermont Transportation Co., Montreal, Can.; length over all, 295 ft.; gross tonnage, 2,680; one triple expansion single screw engine of 2,000 H. P.; three cylindrical boilers.

American Car & Foundry Co., Wilmington, Del.

Car Float No. 74, for the Pennsylvania Railroad Co., Jersey City, N. J.; 250 ft. long over all, 612 gross tons.

Car Float No. 45, for the Pennsylvania Railroad Co., Jersey City, N. J.; 250 ft. long over all, 612 gross tons.

Car Float No. 48, for the Pennsylvania Railroad Co., Jersey City, N. J.; 250 ft. long over all, 612 gross tons.

Dump scow No. 22, for the Coastwise Dredging Co., of Norfolk, Va.; 138 ft. long over all, 1,200 gross tons.

Dump scow Ruth, for the Delaware River Lighting & Trans. Co.; 130 ft. long over all, 400 gross tons.

House barge City of Philadelphia, for Philadelphia Harbor Transfer, Philadelphia, Pa.; 106 ft. long over all, 400 gross tons.

Coal barge Harriet M., for the Delaware River Lighting & Trans. Co., Philadelphia, Pa.; 130 ft. long over all, 350 gross tons.

Coal barge Eleanor, for the Philadelphia Lighting & Trans. Co., Philadelphia, Pa.; 130 ft. long over all, 350 gross tons.

Dump Scow No. 23, for the Coastwise Dredging Co., Norfolk, Va.; 140 ft. long over all, 1,200 gross tons.

Lighter Bradley, for National Lead Co., New York; 90 ft. long over all; 350 gross tons.

Dump scow No. 12, for the J. S. Packard Dredging Co., Providence, R. I.; 123 ft. long over all, 1,000 gross tons.

Dump scow No. 14, for the J. S. Packard Dredging Co., Providence, R. I.; 123 ft. long over all, 1,000 gross tons.

Dump scow No. 24, for the Coastwise Dredging Co., Norfolk, Va.; 140 ft. long over all, 1,200 gross tons.

Grain barge for the Philadelphia Harbor Transfer, Philadelphia, Pa.; 101 ft. long over all, 750 gross tons.

Craig Ship Building Co., Long Beach, Cal.

Wooden hull ocean tug for the Western Pacific Railway Co., of San Francisco; length over all, 124 ft., approximate value, \$65,000; single screw compound engine of 750 H. P. with cylinders 20 and 42 in. diameter by 24 in. stroke; Babcock & Wilcox Boilers with 25,000 sq. ft. of heating surface.

One clamshell dredge for the Western Dredging & Marine Construction Co., of Long Beach, Cal., length over all, 100 ft.; beam, 35 ft.; depth, 8 ft.; approximate value, \$25,000; double compound engine of 150 H. P., cylinders of 8 and 16 in. diameter by 14 in. stroke; one water tube boiler.

New triple expansion engine for the excursion steamer City of Long Beach, owned by the Nelson Navigation Co., of Long Beach; cylinders of 12, 21 and 33 in. diameter by 20 in. stroke; two Taylor water tube boilers.

Steel suction dredge C. H. Windhem, owned by the Western Dredging & Marine Construction Co., Long Beach, Cal.; length over all, 110 ft.; beam, 35 ft.; depth, 8 ft.; electric machinery throughout, the current being furnished by mountain streams; valued at \$85,000.

W. & A. Fletcher Co., Hoboken, N. J.

One simple beam surface condensing engine of 4,000 H. P., 75 in. diameter by 12 ft. stroke, for the side wheel passenger steamer Robert Fulton, building for the Hudson River Day Line by the New York Shipbuilding Co., Camden, N. J.

One simple beam surface condensing engine of 2,600 H. P., 70 in. in

diameter by 12 ft. stroke, for the passenger and freight steamer Trojan, building for the Hudson Navigation Co., of New York.

One simple beam surface condensing engine of 2,600 H. P., 70 in. in diameter by 12 ft. stroke, for the duplicate of the freight and passenger steamer Trojan, building to the order of the Hudson Navigation Co., of New York.

One simple beam surface condensing engine of 4,500 H. P., 84 in. in diameter by 12 ft. stroke, for the steamer Princeton, building for the Hudson Navigation Co., of New York.

E. W. Heath, Tacoma, Wash.

Wooden whaling steamer for the Whale Products Co. of North America, Seattle, Wash.; length over all, 100 ft.; value, complete, \$45,000; estimated gross tonnage, 100; triple expansion single screw engine of 360 H. P.; one Scotch boiler.

Wooden fishing vessel, sail with gasoline auxiliary, for the Tacoma Fish Co., of Tacoma, designed for the halibut trade; length over all, 66 ft. 6 in.; approximate value, \$8,000; estimated gross tonnage, 35; San Francisco Standard engine of 30 H. P.

Wooden tug boat for the Snowdon-Owsley Logging Co., of Seattle, Wash.; length over all, 52 ft.; approximate value, \$7,500; estimated gross tonnage, 20; San Francisco Union Gas Engine, of 55 H. P.

One wooden scow for the Tacoma Tug and Barge Co., Tacoma, Wash.; length over all, 82 ft.; value, \$3,800; estimated gross tonnage, 140.

One wooden scow for the St. Paul & Tacoma Lumber Co., Tacoma, Wash.; length over all, 82 ft.; value, \$3,800; estimated gross tonnage, 140.

C. Hildebrandt, Rondout, N. Y.

Wooden coal barge Sadie S. Weber, for L. S. Weber, of New York; 90 ft. long.

Wooden coal barge Alice McLoughlin, for E. McLoughlin, New York; 90 ft. long.

Wooden coal barge John F. Schmadeke No. 4, for J. F. Schmadeke, Brooklyn, N. Y.; 100 ft. long.

Wooden coal barge Dorothy May, for George F. McCaffrey, New York; 112 ft. long.

Wooden brick barge Empire No. 16, for Robert Main, Saugerties, N. Y.; 116 ft. long.

Wooden coal barge Edith, for F. H. Lane, New York; 90 ft. long.

Wooden coal barge Emma, for F. H. Lane, New York; 100 ft. long.

Wooden brick barge for Empire Brick Co., New York; 116 ft. long.

Wooden brick barge 114 ft. long for stock.

Wooden coal barge 100 ft. long for stock.

George Lawley & Son Corp., South Boston, Mass.

Steam yacht for Com. Ed. Ford, of Rossford, O.; length over all, 125 ft.; approximate value, \$50,000; triple expansion twin-screw engine of 800 H. P.; one Roberts boiler.

Gasoline yacht for Mr. Henry B. Anderson, New York; length over all, 112 ft.; approximate value, \$38,000; twin screw gasoline engine of 300 H. P. of the Craig type.

Auxiliary schooner yacht for Mr. W. Harry Brown, of Pittsburg, Pa.; length over all, 197 ft.; approximate value, \$240,000; estimated gross tonnage, 499; triple expansion single screw engine of 750 H. P.; one Scotch boiler.

Schooner yacht for Mr. Alfred Douglass, of New York; length over all, 90 ft.; approximate value, \$28,000.

New Burrell-Johnson Iron Co., Ltd., Yarmouth, Nova Scotia.

Steeple compound surface condensing engine of 50 H. P., with cylinders 7 and 14 in. diameter by 10 in. stroke and one vertical boiler 48 in. in diameter by 8 ft. long, with a working pressure of 135 pounds, for the 50-ft. wooden steamer Lottie and Marguerite, owned by C. A. Goreham, Wood's Harbor, N. S.

Fore and aft surface condensing engines of 150 H. P., with cylinders 12 and 24 in. in diameter by 18 in. stroke and one horizontal boiler 8 ft. 6 in. in diameter by 9 ft. long, for the wooden towboat Hugh D, owned by Hugh Cann & Son, Yarmouth, N. S.

Steeple surface condensing engines of 50 H. P., with cylinders 7 by 14 in. in diameter by 10 in. stroke and one 51 in. vertical boiler for a 50-ft. wooden ferry steamer owned by B. Dolan, Granville Ferry, N. S.

Triple expansion surface condensing 400 H. P. engine with cylinders 12, 19 by 30 in. in diameter by 20 in. stroke, and one marine boiler 11 ft. in diameter designed for a working pressure of 180 pounds, for a 97-ft. steel tugboat for the department of public works of the Dominion of Canada.

James Reese & Sons Co., Pittsburg, Pa.

Steam tow boat B. F. Jones for the Vesta Coal Co., of Pittsburg; length over all, 135 ft.; approximate value, \$75,000; estimated gross tonnage, 96; tandem compound engine of 400 H. P.; two flue boiler.

Steam towboat Nile for the Egyptian government; length over all, 141 ft.; approximate value, \$70,000; estimated gross tonnage, 120; cross compound engine of 300 H. P.; tubular boiler.

Steamer Meddeline for South American waters; length over all, 170 ft.; approximate value, \$60,000; estimated gross tonnage, 250; high pressure engine of 300 H. P.; tubular boiler.

Steamer Caldas, for South American waters; length over all, 170 ft.; approximate value, \$60,000; estimated gross tonnage, 250; high pressure engine of 300 H. P.; tubular boiler.

John Ryan, Whitehall, N. Y.

Barge Lillie and Lester, for Lester Gray, of New York; length over all, 98 ft. 6 in.; approximate value, \$4,100; estimated gross tonnage, 100.

Barge Benjamin H. Bascom, for L. C. T. Co., Whitehall, N. Y.; length over all, 98 ft. 6 in.; approximate value, \$3,500; estimated gross tonnage, 100.

Barge Walter N. Weeks, for the L. C. T. Co., Whitehall, N. Y.; length over all, 98 ft. 6 in.; approximate value, \$3,500; estimated gross tonnage, 100.

Barge Elizabeth Groves, for John T. Groves, Kingston, N. Y.; length over all, 98 ft. 6 in.; approximate value, \$3,500; estimated gross tonnage, 100.

Barge Frank Jennings, for Frank Jennings, Whitehall, N. Y.; length over all, 98 ft. 6 in.; approximate value, \$3,500; estimated gross tonnage, 100.

Barge, 98 ft. 6 in. long over all, valued at \$3,500; estimated gross tonnage, 100.

Staten Island Ship Building Co., Port Richmond, S. I., N. Y.

Steel sea-going tug Mary F. Scully, for Scully Towing line, 1 Broadway, New York; length over all, 180 ft.; estimated gross tonnage, 620; triple-expansion single-screw engine of 1,200 H. P., with cylinders 17, 27 and 45 in. diameter by 36-in. stroke; one Scotch marine boiler and one vertical donkey boiler.

Steel sea-going tug, for stock; length over all, 120 ft.; triple-expansion single-screw engine of 600 H. P., with cylinders 14, 22 and 36 in. diameter by 24-in. stroke; one Scotch marine boiler and one vertical donkey boiler.

Steel sea-going tug Edw. T. Berwind, for Berwind-White Coal Co., 1 Broadway, New York; one Scotch boiler.

Union Iron Works, San Francisco, Cal.

Wooden steamer Lieut. W. L. Murphy, for the quartermaster's department, United States army; length over all, 65 ft.; about 25 tons gross; compound single-screw engine of 100 H. P.; one Taylor boiler.

Wooden steamer Lieut. J. A. Gurney, for the quartermaster's department, United States army; length over all, 65 ft.; about 25 tons gross; compound single-screw engine of 100 H. P.; one Taylor boiler.

Wooden steamer Capt. Anton Springer, for the quartermaster's department, United States army; length over all, 65 ft.; about 25 tons gross; compound single-screw engine of 100 H. P.; one Taylor boiler.

Two dry back boilers for the ferry boat Cazadero, owned by the Northwestern Pacific R. R. Co., 12 ft. 6 in. diameter by 14 ft. 7 in. long.

One boiler for the wooden tug Gleaner, 11 ft. in diameter by 10 ft. 6 in. long.

Willamette Iron & Steel Works, Portland, Ore.

Steel single-screw passenger steamer H. B. Kennedy, for Capt. Kennedy, of Seattle, Wash.; length over all, 190 ft.; approximate value, \$170,000; four-cylinder triple-expansion single-screw engine of 2,000 H. P.; two Ballin pipe boilers.

Two artillery tenders for the quartermaster's department, United States army; steel hulls, 98 ft. long over all; approximate value, \$60,000 each; fore and aft compound single screw engine of 350 H. P. and one Scotch marine boiler in each.

Wooden river boat The Alice, for the Alaska Commercial Co., of San Francisco, for use in Alaskan waters; length over all, 110 ft.; approximate value, \$20,000; double engines for driving stern paddle wheel, 200 H. P.; one firebox boiler.

R. L. Bean, Camden, Me.

Three-masted schooner for Rogers & Webb, 126 State street, Boston, Mass.; length over all, 156 ft.; approximate value, \$30,000; estimated gross tonnage, 375; 9 H. P. Knox gasoline engine.

Three-masted schooner for Rogers & Webb, 126 State street, Boston, Mass.; length over all, 167 ft.; approximate value, \$32,000; estimated gross tonnage, 425; 9 H. P. Knox gasoline engine.

R. Bigelow, Monument Beach, Mass.

Cabin launch 35 ft. long, 7 ft. beam and 2 ft. 6 in. draught; 25 H. P. engine furnished by Chas. J. Jager Co., 166 High street, Boston, Mass.

Catboat 20 ft. long, 8 ft. beam; 2 ft. 4 in. draught.

Open knockabout 26 ft. long, 7 ft. wide and 4 ft. draught.

F. S. Bowker & Son, Phippsburg, Me.

Wooden three-masted schooner Frank B. Witherbee, for Rogers & Webb, Boston, Mass.; length over all, 162 ft.; approximate value, \$30,000; estimated gross tonnage, 504.

Wooden three-masted schooner for Capt. A. A. Cory, New Bedford, Mass.; length over all, 162 ft.; approximate value, \$30,000; estimated gross tonnage, 504.

C. F. Brown, Pulpit Harbor, North Haven, Me.

Wooden launch Washishima, for F. A. Smith, Worcester, Mass.; length over all, 61 ft.; approximate value, \$6,000; estimated gross tonnage, 15; 40 H. P. gasoline engine.

Wooden launch for R. H. Hammond, Worcester, Mass.; length over all, 51 ft.; approximate value, \$3,000; estimated gross tonnage, 7; 25 H. P. gasoline engine.

William Cruger, East Oakland, Cal.

Gasoline passenger boat Duchess, for Lauritzen Bros., of Antioch, Cal.; length over all, 85 ft.; approximate value, \$18,000; estimated gross tonnage, 50; single screw gasoline engine of 125 H. P.

G. G. Deering Co., Bath, Me.

Four-masted schooner 180 ft. in length, valued at \$68,000 and of 1,105 gross tons, estimated. For G. G. Deering Co.

Dubuque Boat & Boiler Works, Dubuque, Ia.

Side wheel steamer Dorothy, for the Union Terminal Co., St. Joe, Mo.; length over all, 87 ft.; approximate value, \$9,000; estimated gross tonnage, 84; oscillating compound engines of 60 H. P.; Mississippi type boiler.

Howard Ship Yards Co., Jeffersonville, Ind.

Wooden stern wheel steamer City of Muskegon; length over all, 145 ft.; approximate value, \$14,000; estimated gross tonnage, 100; high pressure cylinder engines.

Derrick boat 120 ft. long over all, valued at \$7,500.

Wooden stern wheel towboat, 145 ft. long over all, approximate value, \$20,000; estimated gross tonnage, 125; high pressure cylinders.

Stern wheel snag and towboat, steel, for the United States government.

Two stern wheel wooden towboats for the United States government; length over all, 125 ft. each; approxi-

mate value, \$10,000 each; estimated gross tonnage, 90 each; high pressure cylinders.

Four log barges of wood, 160 ft. long.

One fuel flat, of wood, 100 ft. long.

Two wooden snag boats for the United States government; each 125 ft. long; approximate value, \$20,000 each; estimated gross tonnage, 125 each; high pressure cylinders.

Two wooden barges for the United States government; length over all, each, 135 ft.; approximate value, each, \$7,000; estimated gross tonnage, each, 135.

J. S. Ellis & Son, Tottenville, S. I., N. Y.

Tugboat hull 72 ft. long, for Newtown Creek Towing Co.

David Fenton, Manchester-by-the-Sea, Mass.

One 30-ft. open launch for stock, with 15 H. P. Buffalo gasoline engine.

Oliver Gildersleeve & Sons, Gildersleeve, Conn.

Six wooden deck lighters for stock; length over all, each, 110 ft.; approximate value, \$7,500, each; estimated gross tonnage, each, 312; no power.

One wooden coal barge for stock; length over all, 100 ft.; approximate value, \$6,000; estimated gross tonnage, 346; no power.

Gillett & Eaton, Lake City, Minn.

New engines for stern wheel steamer owned by Fuller Bros., of Brownsville, Pa.; 150 H. P.

New engines for stern wheel steamer Paloma, owned by the Columbia Digger Co., of Portland, Ore.; 450 H. P.

New engines for stern wheel steamer owned by the Shreveport Cottonwood Co., Ltd., of Shreveport, La.; 90 H. P.; valued at \$6,000.

Greenport Basin & Construction Co., Greenport, N. Y.

Wooden launch for C. W. Bingham, of Cleveland, O.; 21 ft. long; valued at \$1,200; four cycle Van Auken gasoline engine of 14 H. P.

Wooden launch for stock; 25 ft. long; valued at \$750; 8 H. P. gasoline motor.

Wooden launch for stock; 55 ft. long; valued at \$10,000; 40 to 60 H. P. gasoline motor.

O. A. Ham, Mahone Bay, Nova Scotia.

One knockabout for Herbert Brookfield, Chester, N. S.; 26 ft. long, valued at \$450.

One gasoline yacht for Herbert Brookfield, Chester, N. S.; length over all, 46 ft.; approximate value, \$3,000; estimated gross tonnage, 16; five cyl-

inder, four cycle 30 H. P. gas engine of English make.

Gasoline launch for H. E. Buddham; 23 ft. long; valued at \$450; two cylinder, four cycle Buffalo engine of 7½ H. P.

Gasoline launch for O. A. Nenn; 18 ft. long; valued at \$300; two cylinder, four cycle Buffalo engine of 2½ H. P.

Steam yacht 42 ft. long, valued at \$1,600, and of 12 gross tons. Name of owner not made public.

A. F. Hutton, Railroad Avenue and Flyer Dock, Seattle, Wash.

Engine for wooden passenger propeller for Matthew McDowell, Tacoma, Wash.; triple expansion, 400 H. P.; Taylor water tube boiler.

Engine for wooden passenger propeller for N. Fay, Sacramento, Cal.; fore and aft compound, 150 H. P.; firebox boiler.

R. F. Keough, East Boston, Mass.

Wooden fireboat hull, 113 ft. long over all; machinery by the Bertelsen & Peterson Engineering Co., of East Boston.

Long Island City Machine & Marine Construction Co., Long Island City, N. Y.

One 80-H. P. high pressure engine for installation in tug building for the Newtown Creek Towing Co. by J. Ellis & Son, Tottenville, S. I., N. Y.

Madison Marine Railway & Ship Yard, Madison, Ind.

Two barges for Mengel Box Co., of Louisville, Ky.; length over all, each, 160 ft.; approximate value, \$8,000 each; estimated gross tonnage, each, 350.

Main Street Iron Works, 163-173 Main Street, San Francisco, Cal.

Wooden steamer Majestic, for Ira J. Harmon, of San Francisco; length over all, 211 ft.; approximate value, \$130,000; estimated gross tonnage, 650; one triple expansion engine with cylinders 13, 21½ and 36 in. diameter by 24-in. stroke, 675 H. P.; two Babcock & Wilcox boilers.

Wooden tug Gleaner, for the Gardner Mill Co., of San Francisco; length over all, 100 ft.; approximate value, \$45,000; estimated gross tonnage, 145; one compound engine of 450 H. P.; one Scotch marine boiler.

Meyers Ship Building Co., National City, Cal.

This is a new plant having for its specialty the introduction of the shallow draught steel boat of tunnel type for bays and waters of the Pacific. One of these vessels is now building which is 40 ft. in length. She is to be used for general ferry purposes

and is fitted with Scotch boiler and a 100-H. P. twin fore and aft engine.

The Moran Co., Seattle, Wash.

Steel steam schooner 252 ft. 5 in. long over all; 1,838 gross tons; single screw triple expansion engine of 850 H. P.; main boilers, two single ended Scotch; donkey boiler, one vertical fire tube.

Mozena Bros., Clarington, O.

Two gasoline boats 60 ft. long by 12 ft. beam.

New England Marine Engine Co., Noank, Conn.

One compound single screw marine engine for the city of New York, of 250 H. P.

One compound single screw engine for Allison & Wilcox, of 110 H. P.

Frederic S. Nock, East Greenwich, R. I.

Wooden power cruiser for C. M. Dunbar, 85 Sprague street, Providence, R. I.; length over all, 57 ft.; approximate value, \$8,000; estimated gross tonnage, 24; four cylinder, four stroke gas engine manufactured by the Charles J. Jager Co., 166 High street, Boston, Mass., 40 H. P.

Wooden power cruiser for stock; length over all, 35 ft.; approximate value, \$2,000; two cylinder, four stroke gas engine of 10 to 15 H. P., manufactured by the Chase Engine Co., Providence, R. I.

Samuel J. Pregnall, Charleston, S. C.

Tug Brien Bron, of live oak and pine construction; for stock; length over all, 90 ft.; approximate value, \$12,000; estimated gross tonnage, 56; single engine 22 in. square, 75 H. P., single screw; marine boiler.

Tug E. H. Jackson, for stock; length over all, 95 ft.; approximate value, \$10,000; estimated gross tonnage, 61; fore and aft compound single screw engine, with cylinders 10 and 20 in. in diameter by 12-in. stroke, 65 H. P.; one marine boiler.

One tug hull for stock; length over all, 70 ft.; value, \$2,500. Not equipped with engine.

Steam launch Flory, for stock; length over all, 40 ft.; approximate value, \$1,500; estimated gross tonnage, 10; single upright keel condenser engine of 10 H. P.

Oliver Reeder & Son, Baltimore, Md.

Wooden open harbor lighter for stock; length over all, 92 ft.; approximate value, \$3,000; estimated gross tonnage, 206; no power.

Risdon Iron & Locomotive Works, San Francisco, Cal.

Steel fireboat David Scannel, for the city of San Francisco; length over all, 129 ft.; approximate value, \$190,-

000; estimated gross tonnage, 250; compound twin screw engine with cylinders 13 and 28 in. in diameter by 20-in. stroke, developing 600 H. P.; two Babcock & Wilcox water tube boilers.

Steel fireboat Dennis T. Sullivan, for the city of San Francisco; length over all, 129 ft.; approximate value, \$190,000; estimated gross tonnage, 250; compound twin screw engine with cylinders 13 and 28 in. in diameter by 20-in. stroke, developing 600 H. P.; two Babcock & Wilcox water tube boilers.

Sawyer Bros., Millbridge, Me.

Four-masted schooner for stock; length on keel, 160 ft.; beam, 36 ft. depth of hold, 13 ft.

Seaford Marine Railway Co., Seaford, Del.

Three-masted schooner for Capt. H. Bell; length over all, 180 ft.; approximate value, \$41,000; estimated gross tonnage, 700.

Gasoline launch, 45 ft. in length over all; approximate value, \$1,200; estimated gross tonnage, 10; to be fitted with a 16-H. P. Fulton gas engine.

Southern Ship Building Co., Tottenville, S. I., N. Y.

Wooden coal scow for Tottenville interests; 95 ft. long over all; valued at \$4,500.

Wooden coal scow for Tottenville interests; 100 ft. long over all; valued at \$5,000.

W. B. Stearns, Marblehead, Mass.

Wooden auxiliary schooner yacht 60 ft. in length; approximate value, \$10,000; estimated gross tonnage, 25; 20-H. P. internal combustion engine.

Joseph Supple, Portland, Ore.

Wooden steamer Hyak, for the Kitsap County Trans. Co., of Seattle, Wash.; length over all, 140 ft.; approximate value, \$75,000; estimated gross tonnage, 250; triple expansion single screw engine of 750 H. P. and one water tube boiler, both building by the Gas Engine & Power Co. and Charles L. Seabury & Co., Consolidated, Morris Heights, N. Y.

E. James Tull, Pocomoke City, Md.

Wooden yacht for the Rev. Thomas Dixon, of New York; length, 55 ft.; breadth, 18 ft.; depth, 4 ft.; tonnage, 50. She is valued at \$3,500 and is built with a view to later installing auxiliary power.

George C. Walker, Toledo, Ore.

Wooden two-masted auxiliary steamer, for Capt. G. M. Walker, of Portland, Ore.; length over all, 120 ft.; approximate value, \$14,000; estimated

gross tonnage, 410; steeple compound single screw engine of 340 H. P.; one Scotch marine boiler, built by the Marine Iron Works, Chicago, Ill.

Gasoline fishing schooner for Ray Chambers, Newport, Ore.; 46 ft. long; valued at \$5,000; 37 gross tons; 15 H. P. gasoline engine.

Dredger barge for M. M. Davis, Newport, Ore.; length over all, 86 ft.; approximate value, \$7,000; estimated gross tonnage, 116; 180 H. P. steam engine. This dredge is built on the steam shovel plan and is for use in dyking tide lands on Yaquina Bay, Ore.

Washington Iron Works, Seattle, Wash.

One compound single screw marine engine of 250 H. P. and one Scotch boiler fitted with Morrison furnace.

Kingsford Foundry & Machine Works, Oswego, N. Y.

One boiler for the steamer H. S. Caswell, of New York.

One boiler for steamer Elsa, of Newburgh, N. Y.

One boiler for steamer Viking, of New York.

Two boilers for dredges owned by the Morris & Cummings Co., of New York.

One boiler for the steamer Howell, of Providence, R. I.

One boiler for the steamer Regina, of San Francisco.

One boiler for the steamer J. S. Packard, of Boston, Mass.

One boiler for the steamer St. Joseph, of Oswego, N. Y.

Two boilers for the steamer Nipigon, of Ogdensburg, N. Y.

One boiler for the steamer C. H. Moore, of Galveston, Tex.

Three boilers for the Oswego water works.

J. T. Sharpley, Franklin City, Va.

Wooden schooner Surprise for stock; length over all, 60 ft.; approximate value, \$1,000; estimated gross tonnage, 20.

Two wooden launches each 30 ft. in length, valued at \$500 apiece. They are fitted with two-cylinder gasoline engines of 10 H. P. each.

E. H. Brown, Taunton, Mass.

Gasoline yacht Gypsy II., for G. R. Babbitt, Providence, R. I.; length over all, 47 ft. 6 in.; approximate value, \$6,500; estimated gross tonnage, 15; Standard motor, 25 H. P.

Gasoline yacht for I. S. Williams, Taunton, Mass.; length over all, 40 ft. 6 in.; approximate value, \$4,500; estimated gross tonnage, 12; Standard motor, 12 H. P.

GREAT LAKES YARDS.

Alexander & Cox Co., Ogden and Western Avenues, Chicago, Ill.

One 16-H. P. four cylinder gasoline engine for a 25-ft. cabin cruiser for R. H. Peterson, 29 Carlisle place, Chicago.

One 6-H. P. two cylinder gasoline engine for a 25-ft. hunting cabin cruiser for I. Heckman, 1 Park avenue, Chicago.

Davis Dry Dock Co., Kingston, Ont., Can.

Composite steam barge for Edward Smith, of Brewers Mills, Ont.; length over all, 112 ft.; approximate value, \$16,000; estimated gross tonnage, 210; fore and aft compound, single screw engine of 125 H. P.; one Clyde boiler.

Wooden pleasure yacht for Wilson Miller estate, Pittsburg, Pa.; length over all, 53 ft.; approximate value, \$5,500; estimated gross tonnage, 21; triple expansion, single screw engine of 125 H. P.; Davis safety water tube boiler.

Wooden passenger steamer for stock; length over all, 76 ft.; approximate value, \$6,000; estimated gross tonnage, 108; fore and aft compound, single screw engine of 140 H. P.; Davis safety water tube boiler.

Wooden pleasure yacht for western inland lakes; length over all, 30 ft.; approximate value, \$800; 6 gross tons; double, high pressure single screw engine of 10 H. P.; Davis safety water tube boiler.

Wooden pleasure yacht for J. Smith, Kingston, Ont.; length over all, 34 ft.; approximate value, \$1,500; 9 gross tons; single screw gasoline motor of 20 H. P.

Rebuilding of steamer Isleway, wooden, burned July, 1908; owned by the Isleway Fish and Game Club, Montreal; original value, \$4,000; cost of repairs, \$850. A new Clyde boiler will also be installed at a cost of \$950.

Empire Ship Building Co., Buffalo, N. Y.

Steel drill boat for the Buffalo Dredging Co., Buffalo, N. Y.; length over all, 137 ft. 6 in.; approximate value, \$50,000; one Scotch boiler.

Steel sand suction steamer for the Builders' Supply & Sand Co., of Erie, Pa.; approximate value, \$40,000; two single engines with 150 H. P.; one Scotch boiler.

Steel drill boat for the Empire Engineering Corporation, of New York; length over all, 137 ft. 6 in.; approximate value, \$50,000; one Scotch boiler. **P. H. Fitzgibbons Boiler Co., Ogdensburg, N. Y.**

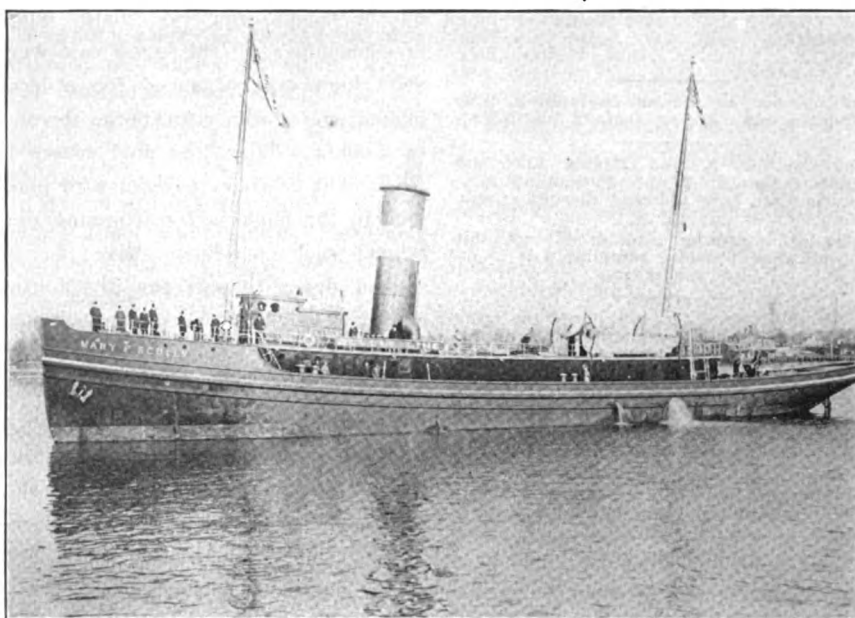
One pair marine boilers for the

steamer Fred Mercur, owned by the George Hall Coal Co., Ogdensburg, N. Y.; 7 ft. in diameter and 14 ft. 6 in. in length, of the horizontal marine type.

THE SEA-GOING TUG MARY F. SCULLY.

The Mary F. Scully, the powerful sea-going tugboat shown in the accompanying photograph, was recently completed at the yards of the Staten Island Shipbuilding Co. for the Scully Towing Line of New York, and is

of steam and hand steering gear, steam windlass on the main deck with a capstan on the forecastle deck. In the engine room all the pumps are independent and of large capacity. There is also a feed water heater. The vessel is lighted throughout by electricity, the dynamo being installed in the engine room, the plant including a searchlight and tell-tale for running lights. The boiler, which is of the Scotch marine type, is 16 feet 6 inches in diameter and 12 feet in length, and is the largest boiler ever



THE NEW SEA-GOING TUG MARY F. SCULLY, BUILT BY THE STATEN ISLAND SHIP BUILDING CO., FOR THE SCULLY TOWING LINE.

now in service. Her general dimensions are: Length, 180 ft.; beam, 30 ft., and depth, 19 ft. Her propelling machinery consists of one set of triple expansion engines, having cylinders of 17-inch, 27-inch and 45-inch diameter, by 36-inch stroke. They indicate 1,200 horsepower.

The Mary F. Scully has been designed by the builders especially for long distance towing, the design being based on experience gained in the construction of large tugboats of this type. The sides forward have been carried up to a steel deck which is a continuation of the house deck and which is carried back for a distance of 37 feet from the stem, this arrangement allowing the vessel to proceed without regard to any ordinary stress of weather. As a further help to navigation in severe weather an inside passageway has been arranged on the main deck so that the crew can operate the vessel without being exposed.

The auxiliaries consist, on the deck,

put into a tugboat. To insure sufficient steam at all times under all conditions a forced draft apparatus with a Sirocco blower, driven by a steam turbine, is being used. In the boiler room is a donkey boiler of sufficient size to furnish steam to all auxiliaries. The main boiler carries a working pressure of 180 pounds.

The most striking feature of the boat, however, is her great coal capacity. With bunkers full the Mary F. Scully can steam for three weeks at full speed and have a steaming radius of 5,000 miles. Nearly all of the 400 tons of coal, her capacity, can be stowed in a large cross bunker. The builders are to be congratulated on the addition of the Mary F. Scully to the large fleet of sea-going tugs they have already built for service, and the Scully Towing Line on the acquisition of this vessel to their fleet and their enterprise in placing such a large and costly tugboat in the general towing business.



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SOLVING THE COALING PROBLEM.

With the increasing size and speed of steamships, and a corresponding decrease in the length of stay in port, the matter of coaling the bunkers has become a problem of no inconsiderable magnitude. In the earlier days of the steamship, when the space devoted to coal stowage was but a comparatively small part of the whole stowage space and a bunker usually consisted of one large compartment, the coaling was regarded more in the light of a necessary evil than a problem of any importance. In these days, however, when every possible square foot of space is given up to the convenient stowing and rapid handling of cargo, when trans-Atlantic liners average over 20 knots, find accommodation for 2,000 souls and steam in past Sandy Hook at an average rate of three or four a day, the coaling of the ship has become of first importance.

The coaling problem has been partially solved in the past decade by various types of apparatus designed to lift the coal from the barge or other medium along-side the vessel and deliver it through the coal port on the vessel's side or deck. The capacities of such machines vary considerably, but the smallest is still a decided improvement on the handling of coal with bucket and winch. Needless to say, where vessels have large athwartship bunkers—commonly called by the marine engineer "main" bunkers—machines of this type can work at a high rate of speed for a large percentage of the entire time devoted to coaling. When the coal ceases to run and it becomes necessary to place men in the bunkers for trimming purposes, such machines have to be slowed down to suit the distributing capacity of the workers shoveling in the bunkers.

In the majority of large and fast steamers there are few of the afore-said main bunkers, the coal being usually stowed on the decks in side bunkers, pockets, alleys and other possible (and sometimes impossible) places surrounding the boilers. These side bunkers and pockets, again, are oftentimes divided into three or four separate sections (or decks) by stringer plates extending entirely, or nearly so, across their width, holes for trimming down purposes being placed at intervals. It will thus be seen that the proper trimming of bunkers on ships designed on this principle means the employment of a considerable number of men in the coal spaces and the close attention to their efforts by the engineers of the vessel. It will also be seen that the coaling machines aforementioned have little opportunity of working at full capacity into bunkers designed on this principle owing to the difficulty encountered in trimming the coal.

The coaling of vessels by machinery is a matter that has long been of much interest to the engineer. Apart from the impossibility of keeping a close watch on the various gangs employed within the bunkers and other duties pertaining to the present-

day method of coaling, there is always the possibility of labor troubles holding the ship in dock through lack of coal. The 'longshoremen's and coal-heavers' strike of 1907 in New York harbor, when the crews of the trans-Atlantic liners had to turn to at increased wages and work night and day on the coaling of the vessels, to the neglect of the work usually assigned to them, is one instance of what is liable to happen at any moment on any of our harbor fronts.

Heretofore the solving of the coaling problem has resulted in the production of machinery designed to deliver the coal through the coal ports only; or, at least, this is the only coaling machinery which has reached the point of practical operation in ship use. This would lead one to the supposition that the designers of the coal delivering apparatus were not sufficiently schooled in the matter of coaling vessels, or did not realize that, so far as the coaling of the modern liner is concerned, the real problem lies in the trimming of the bunkers.

In this issue of MARINE REVIEW we describe in detail an apparatus designed to automatically distribute through the bunkers the coal received at the coal port. That the problem of coaling ships is nearing the point of solution we have no doubt. We have seen the model of this apparatus in operation, and we await with interest, as will the whole shipping and shipbuilding world, the first practical demonstration of the device aboard-ship.

LAKE ENGINEERS AND THE OPEN SHOP POLICY.

The policy of the open shop adopted by the Lake Carriers' Association last spring and steadfastly adhered to throughout the season is creating more interest at the present moment than ever, prompted primarily by the fact that the vessel owners insist upon making individual contracts with the engineers. This policy was pursued by the Pittsburg Steamship Co. during the past season. It entered into individual contracts with all its

men. It has entered into individual contracts also for the season of 1909 and has found no difficulty in filling the places of the few chief engineers who declined to sign the contracts. There is no question of wages involved—merely the question of a vessel owner dealing directly with the man whom he employs and pays.

The Marine Engineers' Beneficial Association has resented this and has preferred charges against a number of its men who entered into individual contracts. The Marine Engineers' Beneficial Association has since notified its men that they must not sign these contracts and that if any have made them they should be returned to the local lodges. The Pittsburgh Steamship Co. has met this move by the simple declaration that if any of its engineers regret having signed individual contracts they can return them and consider the matter ended.

The brunt of the fight seems to center around the men who are employed by the Pittsburgh Steamship Co., and it is understood to be the policy of the association either to fine or expel them. The men, of course, employed by the Pittsburgh Steamship Co. occupy very desirable positions and naturally desire to hold them. Any punishment meted out to them will in all likelihood result in their withdrawal from the association. As far as is known the Pittsburgh Steamship Co. and Picklands, Mather & Co. are the only two fleets that have entered into contracts with their engineers. Since the recent visit of National President Yates, of the Marine Engineers' Beneficial Association, to Cleveland, much pressure has been brought to bear upon engineers to prevent the extension of the individual contract system. In fact, it is understood that the engineers of a number of the leading fleets have refused to enter into individual contracts. These fleets are all members of the Lake Carriers' Association, which is now irrevocably pledged to the open shop policy, and it is clear that the men, unless they do sign individual contracts, will not be employed at all. In order that there will be no misunderstanding on the subject, the vessel owners of Cleveland met and adopted the following notice to be sent to their engineers:

"Before taking up definite appointments to our ships, we wish it understood that in accordance with the policy adopted by the Lake Carriers' Association, and with which you are doubtless familiar, we propose that proper discipline shall obtain on our

ships and our appointments for the coming season will be made only upon the following conditions: First, that there will be no change in the monthly rate of wages; second, terms of employment must include that all departments of our ships will hereafter be conducted in each department on the open shop principle and that your co-operation as an important executive officer on the ship will be required in carrying out this principle.

"We desire to hear from you by return mail whether you will or will not make an application on the foregoing basis."

It would seem as though in this particular the Marine Engineers' Beneficial Association was engaged in the task of splitting hairs. Obviously it desires that its members should be employed at good wages and with fair treatment. In this case it is preventing them from getting jobs—and that, too, when the vessel owners are quite willing that the engineers may remain members of the Marine Engineers' Beneficial Association.

PITTSBURG STEAMSHIP CO.'S OFFICERS AND EMPLOYEES.

The fifth annual convention of the officers and employees of the Pittsburgh Steamship Co. convened at the Hollenden hotel, Cleveland, Wednesday, Jan. 6. President Coulbly addressed the assembly on "The Welfare Plan of the Lake Carriers' Association." In the afternoon, Mr. Hermon A. Kelley, counsel for the steamship company, delivered an address on "Cause of Accidents, and How to Avoid Them." On Thursday morning Robert Logan and R. B. Wallace, of the American Ship Building Co. addressed the men on "The Proper Distribution of Cargo on a Modern Steel Steamer so as to Equalize Strain Over the Entire Structure," and in the afternoon session Dr. Harold Wilson of Conneaut delivered an address on "Sanitary Conditions Aboard Ship." These addresses will be published in the MARINE REVIEW later.

The convention will conclude with the usual dinner at the Hollenden on Friday evening.

TO IMPROVE GRAIN CARRYING CONDITIONS.

Apparently there is concerted action to relieve vessel owners of some of the distress they now suffer in the carriage of grain. At a meeting of the executive committee of the Dominion Marine Association held in Toronto on Jan. 4, the proposal of a clearing house for grain

cargoes at Port Arthur and Fort William so as to do away with the necessity of freighters having to go to so many elevators to collect cargoes was unanimously endorsed.

A general meeting of all interests affected was held at Winnipeg, Jan. 7. The individual members of the Dominion Marine Association have agreed to carry grain only on a bill of lading which relieves them from all liability of shortages of more than ½ bu. on each 1,000 bu. of cargo. The present bill of lading makes the vessel responsible for any shortage of cargo at out-turn points, a condition which vessel owners have always resented, but have never been able to remedy. The shortage has always been charged up against them.

The president and secretary of the Dominion Marine Association will appear before the Lake Carriers' Association at its annual meeting in Detroit, on Jan. 20, to urge unity of action in this regard.

MANAGER FOR GILCHRIST FLEET.

Mr. Samuel P. Shane, of New York, a railroad man of long experience, has just been appointed manager of the Gilchrist Transportation Co.'s fleet of vessels. The selection of Mr. Shane was quite a surprise to vesselmen who thought all along that a lake man would be selected. Mr. Shane has never been identified with the lakes, his whole training having been along railroad lines. However, he is regarded as one of the best traffic men in the country and will undoubtedly prove a valuable acquisition to the Gilchrist interests. He has been for some time past the freight traffic manager of the Erie railroad with headquarters in New York. He began railroading in 1871, as a messenger boy in the general freight office of the Pittsburgh, Cincinnati & St. Louis railway. He joined the Erie force in 1887 as general freight agent at Cleveland, holding that position until 1896, when he became assistant general traffic manager of the Erie & Chicago and Erie roads. His advancement has been steady since. Mr. F. W. Gilchrist, of Alpena, was elected vice president of the Gilchrist Transportation Co.

Capt. Wm. Gerlach has resigned as manager of the steamers Onoke and I. W. Nicholas and will retire from business. The two steamers will hereafter be managed by George Steinbrenner. Capt. Gerlach will leave for the south next week to spend the winter.

Lake Launchings During 1908

During 1908, exclusive of Canadian yards, lake ship yards launched 39 vessels, of which 24 were bulk freighters, 2 passenger boats, 1 package freighter, 1 Canadian canal freighter, 3 tugs, 3 fireboats, 1 lightship, 2 drill boats, 1 sand sucker and 1 supply boat.

Of this program the American Ship Building Co. built 18, 15 of them being bulk freighters, 1 passenger steamer, 1 Canadian canal steamer and 1 fire tug. The Great Lakes Engineering Works launched 9 steamers, 8 of them being bulk freighters and 1 package freighter. The Toledo Ship Building Co. launched 2, 1 bulk freighter and 1 passenger steamer. The Manitowoc Dry Dock Co. launched two fire boats; Johnston Bros., 2 steel tugs; Racine Boat Manufacturing Co., 1 tug and 1 lightship; Empire Ship Building Co., 1 drill boat and 1 sand sucker; Great Lakes Dredge & Dock Co., a drill boat and Paasch Bros. a supply boat. The Collingwood Ship Building Co. was the only yard that figured in the constructive list, having launched the passenger steamer Hamonic.

These 24 bulk freighters have a carrying capacity of 101,400 tons on a single trip, or 2,028,000 tons in an average season.

During 1907 the lake ship yards, exclusive of Canadian yards, launched 56 vessels of which 40 were bulk freighters, 3 package freighters, 1 passenger steamer, 1 wrecker, 1 lighter, 1 mail boat, 5 tugs and 4 scows. These 40 bulk freighters have a carrying capacity of 368,000 gross tons on a single trip. However, as one of the new steamers, the Cyprus, sank on her second trip, the net addition of that year was 361,000 or 7,220,000 tons in an average season.

During 1906 the ship builders of the great lakes, exclusive of the Canadian yards, launched 47 vessels, of which 40 were bulk freighters, 2 passenger steamers, 2 package freighters, 2 car ferries, and 1 sand dredge. The 40 bulk freighters have a carrying capacity of 381,000 tons on a single trip or 7,620,000 gross tons in an average season of 20 trips.

During 1905 the ship builders of the great lakes launched 32 steamers, of which 29 were bulk freighters, 2 package freighters and 1 car ferry. These 29 bulk freighters have 260,200 gross tons carrying capacity on a single trip or 5,204,000 gross tons in an average season of 20 trips.

During 1905 the ship builders of the great lakes launched 32 steamers, of which 29 were bulk freighters, 2 package freighters and 1 car ferry. These 29 bulk freighters have 260,200 gross tons carrying capacity on a single trip

or 5,204,000 gross tons in an average season of 20 trips.

During 1904 lake ship yards launched 13 vessels, of which 7 were bulk freighters, 2 package freighters, 1 car ferry and 3 passenger steamers. The 7 bulk freighters have a carrying capacity of 51,300 tons on a single trip or 1,026,000 in an average season of 20 trips.

During 1903 lake ship yards launched 50 vessels of which 42 were bulk freighters, 5 car ferries and 3 passenger steamers. These 42 bulk freighters have a carrying capacity of 213,250 tons on a single trip or 4,265,000 tons in an average season of 20 trips. It should be stated, however, that 10 of these freighters were built by Mr. Wolvin for St. Lawrence river trade and are actively engaged in that service, but as they are available for the ore trade, they have been classed as bulk freighters with an average capacity of 3,000 tons each on 18-ft. draught.

During 1902 the lake ship yards launched 42 vessels, of which 32 were bulk freighters, 2 car ferries and 2 vessels for salt water service. These 32 bulk freighters have a carrying capacity of 171,910 tons on a single trip or 3,438,200 tons in an average season of 20 trips.

The particulars of vessels launched during 1908 will be found in the accompanying tables:

American Ship Building Co., Cleveland, O.

WHERE BUILT.	TYPE.	NAME OF VESSEL.	LENGTH	CARRYING CAPACITY, OVER ALL GROSS TONS	NAME AND ADDRESS OF OWNER.
Lorain.....	Freighter.....	B. F. Berry.....	569	10,000	Fremont Steamship Co., Detroit, Mich.
Wyandotte.....	Freighter.....	Wainwright.....	440	7,500	Edward Mehl, Erie, Pa.
Lorain.....	Freighter.....	J. J. H. Brown.....	452	8,000	Brown Steamship Co., Buffalo, N. Y.
Lorain.....	Freighter.....	John A. McGean.....	440	7,500	Pioneer Steamship Co., Hutchinson & Co., Mgrs., Cleveland, O.
Buffalo.....	Pass. Str.....	Americana.....	215	4,000*	Lake Erie Excursion Co., Buffalo, N. Y.
Cleveland.....	Freighter.....	J. E. Upson.....	524	9,000	Wilson Transit Co., Cleveland, O.
Lorain.....	Freighter.....	William H. Truesdale.....	452	8,000	Empire Steamship Co., Buffalo, N. Y.
Bay City.....	Freighter.....	A. W. Thompson.....	524	9,000	W. H. Becker, Cleveland, O.
Wyandotte.....	Freighter.....	A. E. Nettleton.....	545	10,000	Wilkinson Transportation Co., Syracuse, N. Y.
Lorain.....	Freighter.....	William H. Wolf.....	524	9,000	Garland Steamship Co., Chicago, Ill. D. Sullivan, Mgr.
Superior.....	Freighter.....	Rufus P. Ranney.....	440	7,500	Triton Steamship Co., Cleveland, O. J. R. Davock & Co., Mgrs.
Cleveland.....	Freighter.....	Howard M. Hanna Jr..	500	8,500	Hanna Transit Co., W. C. Richardson & Co., Mgrs., Cleveland, O.
Lorain.....	Freighter.....	John A. Donaldson.....	400	7,000	Valley Steamship Co., W. H. Becker, Cleveland, Manager.
Bay City.....	Freighter.....	W. R. Woodford.....	552	9,500	W. A. & A. H. Hawgood, Cleveland, O.
Lorain.....	Freighter.....	Price McKinney.....	452	8,000	J. J. Rardon, Chicago, Ill.
Superior.....	Freighter.....	J. F. Dursten.....	452	8,000	Wilkinson Transportation Co., Syracuse, N. Y.
Buffalo.....	Freighter.....	Honduras.....	256	2,000	Davidson Steamship Co., Bay City, Mich.
Lorain.....	Fire tug.....	W. A. McGonagle.....	120	.....	Duluth, Mesabi & Northern Ry. Co., Duluth, Minn.

Great Lakes Engineering Works, Detroit, Mich.

WHERE BUILT.	TYPE.	NAME OF VESSEL.	LENGTH	CARRYING CAPACITY, OVER ALL GROSS TONS	NAME AND ADDRESS OF OWNER.
Ecorse.....	Pkg. Frtr.....	Burlington.....	256	3,000	Rutland Transit Co., Buffalo, N. Y.
St. Clair.....	Freighter.....	Normania.....	440	7,500	Ashtabula Steamship Co., Ashtabula, O.
Ecorse.....	Freighter.....	M. A. Bradley.....	480	8,000	Alva Steamship Co., Cleveland, O.
Ecorse.....	Freighter.....	Harry A. Berwind.....	557	10,500	Mutual Steamship Co., Duluth, Minn. G. A. Tomlinson, Mgr.
Ecorse.....	Freighter.....	William Livingstone.....	557	10,500	Mutual Steamship Co., Duluth, Minn. G. A. Tomlinson, Mgr.
St. Clair.....	Freighter.....	Adam E. Cornelius.....	440	7,500	Boland & Cornelius, Buffalo, N. Y.
Ecorse.....	Freighter.....	James Corrigan.....	550	10,000	Frontier Steamship Co., N. Tonawanda, N. Y. W. M. Mills, Mgr.
Ecorse.....	Freighter.....	Daniel B. Meacham.....	550	10,000	Frontier Steamship Co., N. Tonawanda, N. Y. W. M. Mills, Mgr.
Ecorse.....	Freighter.....	Theodore H. Wickwire..	464	8,500	American Steamship Co., Boland & Cornelius, Buffalo, Mgrs.

Toledo Ship Building Co., Toledo, O.

WHERE BUILT.	TYPE.	NAME OF VESSEL.	CARRYING LENGTH CAPACITY, OVER ALL GROSS TONS	NAME AND ADDRESS OF OWNER.
Toledo.....	Freighter.....	Fred G. Hartwell.....	524 9,000	Mutual Steamship Co., Duluth, Minn.
Toledo.....	Pass. Str.....	Wauketa	185 1,200*	White Star Line, Detroit, Mich.

Collingwood Ship Building Co., Collingwood, Ont.

WHERE BUILT.	TYPE.	NAME OF VESSEL.	CARRYING LENGTH CAPACITY, OVER ALL GROSS TONS	NAME AND ADDRESS OF OWNER.
Collingwood.....	Pkg. Frtr. & Pass.....	Ilamonic	365 5,000	Northern Navigation Co. of Ontario, Ltd., Collingwood, Ont.

Manitowoc Dry Dock Co., Manitowoc, Wis.

WHERE BUILT.	TYPE.	NAME OF VESSEL.	CARRYING LENGTH CAPACITY, OVER ALL GROSS TONS	NAME AND ADDRESS OF OWNER.
Manitowoc.....	Fire boat.....	Joseph Medill	120	City of Chicago.
Manitowoc.....	Fire boat.....	.....	120	City of Chicago.

Johnston Bros., Ferrysburg, Mich.

WHERE BUILT.	TYPE.	NAME OF VESSEL.	CARRYING LENGTH CAPACITY, OVER ALL GROSS TONS	NAME AND ADDRESS OF OWNER.
Ferrysburg.....	Steel tug.....	Francis D. Hackett.....	106	Hackett Wrecking & Towing Co., Amherstburg, Ont.
Ferrysburg.....	Tug.....	Herbert	76	G. Mollhagen & Co., St. Joseph, Mich.

Racine Boat Manufacturing Co., Muskegon, Mich.

WHERE BUILT.	TYPE.	NAME OF VESSEL.	CARRYING LENGTH CAPACITY, OVER ALL GROSS TONS	NAME AND ADDRESS OF OWNER.
Muskegon.....	Steel tug.....	Essayons	85	Government Engineers' Dept., Duluth, Minn.
Muskegon.....	Steel lightship 89.....	.....	83	United States Lighthouse Establishment.

Empire Ship Building Co., Buffalo, N. Y.

WHERE BUILT.	TYPE.	NAME OF VESSEL.	CARRYING LENGTH CAPACITY, OVER ALL GROSS TONS	NAME AND ADDRESS OF OWNER.
Buffalo.....	Drill boat.....	.....	140	Buffalo Dredging Co., Buffalo, N. Y.
Buffalo.....	Sand sucker.....	.....	140	Builders Supply & Sand Co., Erie, Pa.

Great Lakes Dredge & Dock Co., Cleveland, O.

WHERE BUILT.	TYPE.	NAME OF VESSEL.	CARRYING LENGTH CAPACITY, OVER ALL GROSS TONS	NAME AND ADDRESS OF OWNER.
Whiskey Island.....	Drill boat.....	Drill Boat No. 4.....	133	Great Lakes Dredge & Dock Co., Cleveland, O.

Paasch Bros., Erie, Pa.

WHERE BUILT.	TYPE.	NAME OF VESSEL.	CARRYING LENGTH CAPACITY, OVER ALL GROSS TONS	NAME AND ADDRESS OF OWNER.
Erie.....	Wrecking supply boat.....	Pittsburg .....	.....	Pittsburg Steamship Co., Cleveland, O.

*Number passengers.

Manitowoc Steam Boiler Works, Manitowoc, Wis.

One Scotch boiler for the tug Fearless, owned by E. A. Sonneman, Sheboygan, Wis.; 6 ft. in diameter by 8 ft. 6 in. long, 150 pounds working pressure.

One Scotch boiler for the tug Frederick Koehn, owned by Ernst Schneidewind, Sheboygan, Wis.; 6 ft. in diameter by 8 ft. 6 in. long; 150 pounds working pressure.

Marine Boiler Works Co., Front and York Streets, Toledo, O.

Two Scotch boilers for hull No. 56, Great Lakes Engineering Works, 13 ft. 9 in. in diameter by 12 ft. long; 180 pounds working pressure.

Two Scotch boilers for hull No. 57, Great Lakes Engineering Works; 13

ft. 9 in. in diameter by 12 ft. long; 180 pounds working pressure.

Marine Iron Works, Station A., Chicago, Ill.

Launch Aduana, wood construction, copper sheathed, for the police department of the government of Peru; length over all, 36 ft.; value, \$3,000; of 10 gross tons; fore and aft compound engine of 45 H. P., with cylinders 5 and 10 in. in diameter by 6-in. stroke; one vertical submerged tube boiler 42 in. in diameter and 64 in. long.

Launch Salinera, wood construction, copper sheathed, for the police department of the government of Peru; length over all, 36 ft.; value, \$3,000; of 10 gross tons; fore and aft compound engine of 45 H. P., with cylin-

ders 5 and 10 in. in diameter by 6-in. stroke; one vertical submerged tube boiler 42 in. in diameter and 64 in. long.

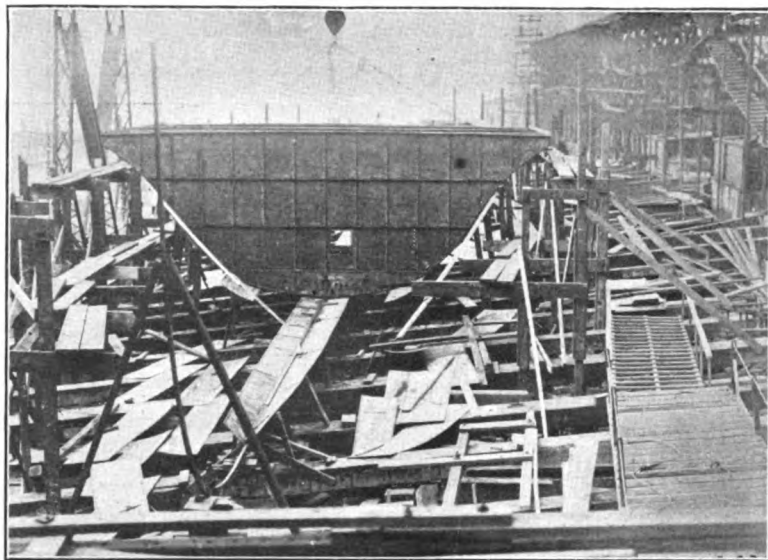
Montague Iron Works, Montague, Mich.

New engine for the steamer Dallas, formerly the Fessenden, owned by R. L. Craig, 43 Produce Exchange, Toledo, O.; engine is 18 by 40 by 30.

Whitman Mfg. Co., 178 Ohio Street, Buffalo, N. Y.

Steel delivery yacht Connelly Bros., for Connelly Bros., of Buffalo, N. Y.; length over all, 42 ft.; approximate value, \$3,000; estimated gross tonnage, 10; 8 in. by 8 in. high pressure 50-H. P. upright engine; one Oldman patent boiler, 6 ft. long and 40 in. wide.

Passenger Steamer Built in Seventy-six Days

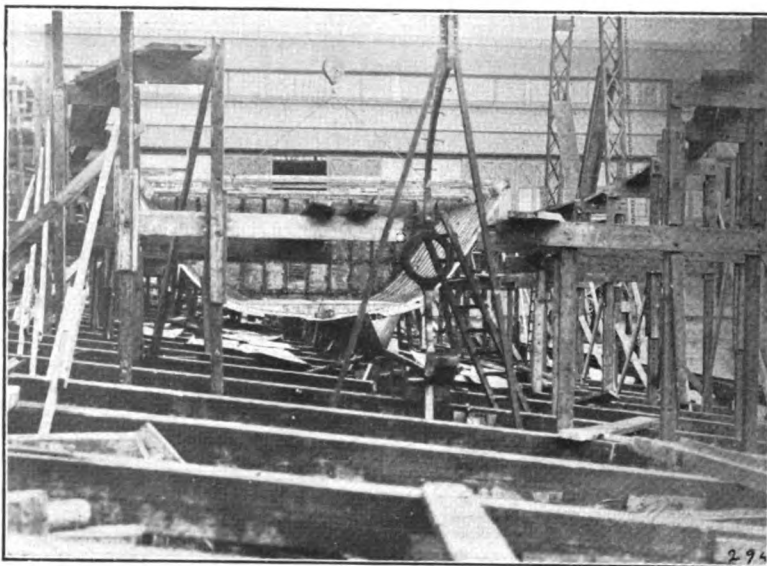


THE WHITE STAR LINE STEAMER WAUKETA ON THE FIRST DAY.

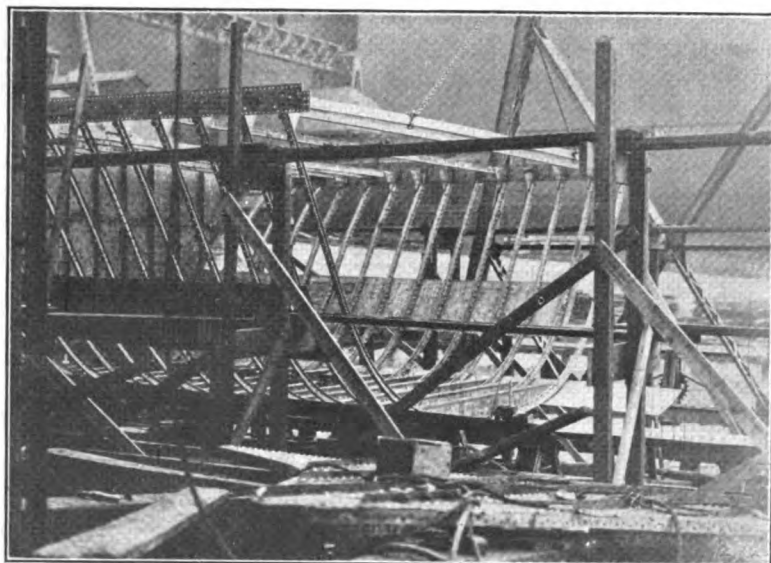
The Toledo Ship Building Co., Toledo, O., has certainly achieved a record in the construction of the White Star Line steamer Wauketa. This steamer was built complete with stack and breeching and main steam pipe and delivered in Detroit in 90 days after the contract was signed.

The actual working time was 76 days of nine hours each. Moreover, the company had to make entirely new plans, patterns and molds for engine and boilers. The keel was laid on Oct. 26 and the vessel was launched Nov. 18, 20 working days of nine hours each, or 180 hours.

The Wauketa is a passenger steamer 185 ft. over all, 175 ft. keel, 38 ft. 4 in. beam and 14 ft. molded depth.



THE WHITE STAR LINE STEAMER WAUKETA ON THE FOURTH DAY.



THE WHITE STAR LINE STEAMER WAUKETA ON THE FOURTH DAY.

She is equipped with a triple-expansion engine, cylinder diameters $17\frac{1}{4}$, $27\frac{1}{2}$, 43 in. by 30-in. stroke, 175 R. P. M. Her boilers number three, 10 ft. 8 in. diameter and 11 ft. 6 in. long, allowed 180 lbs. steam pressure.

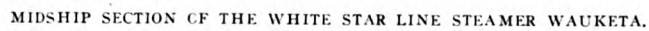
Drawings are herewith published of the inboard profile, midship section, bulkheads, stack and casing, engine and boilers. Photographs are also submitted showing the progress of work on the first day, the fourth day and the twentieth day, the day on which the steamer was launched. Altogether they give a very clear idea of the company's remarkable accomplishment.

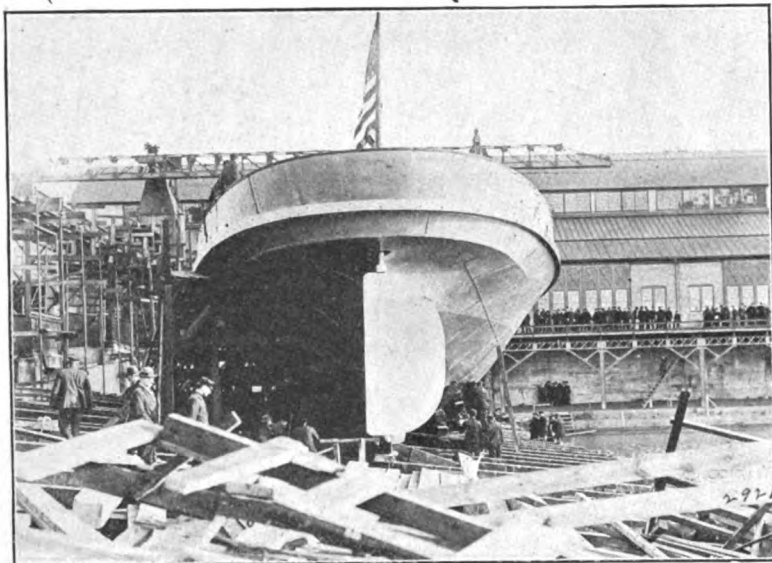
The Sharptown Marine Railway Co., Sharptown, Md., has a contract for building a three-masted bald-headed

schooner for Capt. George Kennerly, of Riverton, Md. The schooner will be 125 ft. long, 26 ft. beam and $8\frac{1}{2}$ ft. molded depth and is to be ready for delivery early in the summer. She is intended for the bay and coasting trade and is designed to meet the requirements of canal locks.

Schuyler & Caddell, Red Hook, N. J., are building a covered barge for George L. Hammond & Co., of New York. The vessel is 100 ft. long, 30 ft. beam and 9 ft. deep.

John Bishop, Gloucester, Mass., launched the schooner Eugenia, building for Sylvanus Smith & Co., Inc., Dec. 5. She is 91 ft. long, 23 ft. beam and 10 ft. deep.

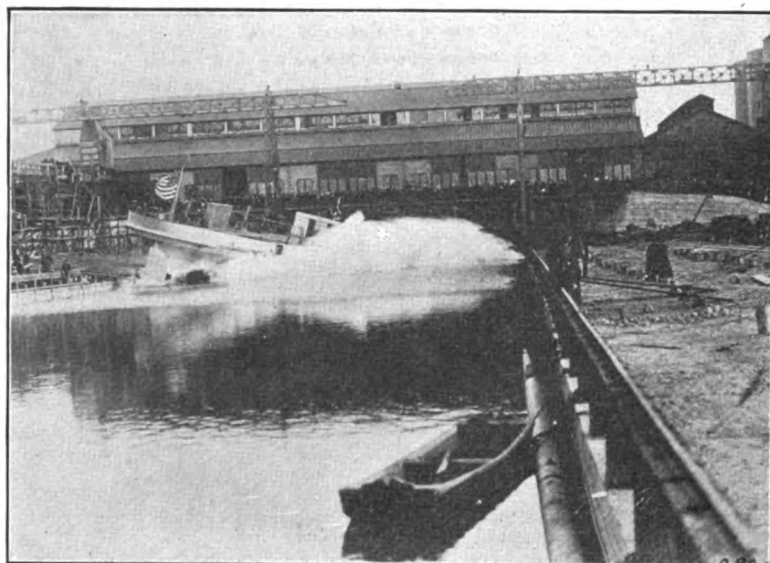




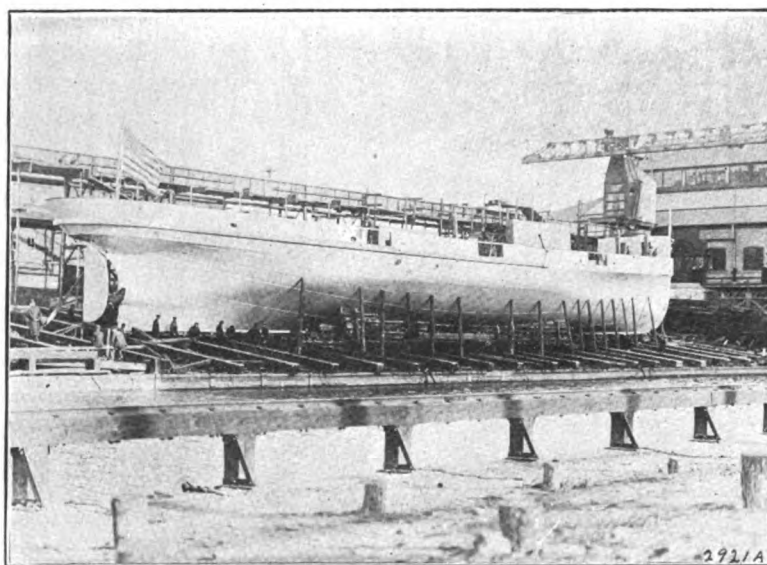
THE WHITE STAR LINE STEAMER WAUKETA ON THE 20TH DAY.

THE PREVENTION OF FIRE ABOARDSHIP.

The loss of life and property by fire at sea during the past year should bring forcibly to the attention of the ship owner and builder the necessity of equipping vessels with some reliable fire detecting appliances. There are no persons more helpless in the face of an overwhelming conflagration than the master and crew of a vessel; and, particularly, if the vessel should happen to be a freighter and no reinforcements of the fire fighting force are to be had. From time to time cases of fire at sea have been reported in which the master and officers have been overcome by the dense smoke and fumes while directing the efforts of the crew, a most dangerous condition where the men with the hose and hatchet are accustomed to looking to their superiors for all



THE WHITE STAR LINE STEAMER WAUKETA ON THE 20TH DAY.



THE WHITE STAR LINE STEAMER WAUKETA ON THE 20TH DAY.

orders and are practically at a loss when left to their own devices even for a short period.

In vessels not equipped with any fire detecting device, a fire may be smoldering and spreading some considerable time before the smoke or heat should make its presence known, and, when discovered, may have gained considerable headway. Again, it takes but the faintest smell of burning to throw a shipful of passengers into a condition of unreasonable excitement, and fortunate indeed are the officers of vessels in the passenger service who have not had the task of dispelling the fears of several hundred excited men and women.

Damage by fire aboardship totals up in the course of a year to a considerable item, yet, as is also the case on land, much more damage is often done

by the material used in extinguishing the flame than is done by the flames themselves. On the majority of vessels steam flooding and hose connections are provided for the cargo spaces, and at the first sign of an outburst of fire every means provided to suppress it are brought into play. The fire may be soon under control, but the damage done to the freight in the hold by the steam and water is oft-times disastrous.

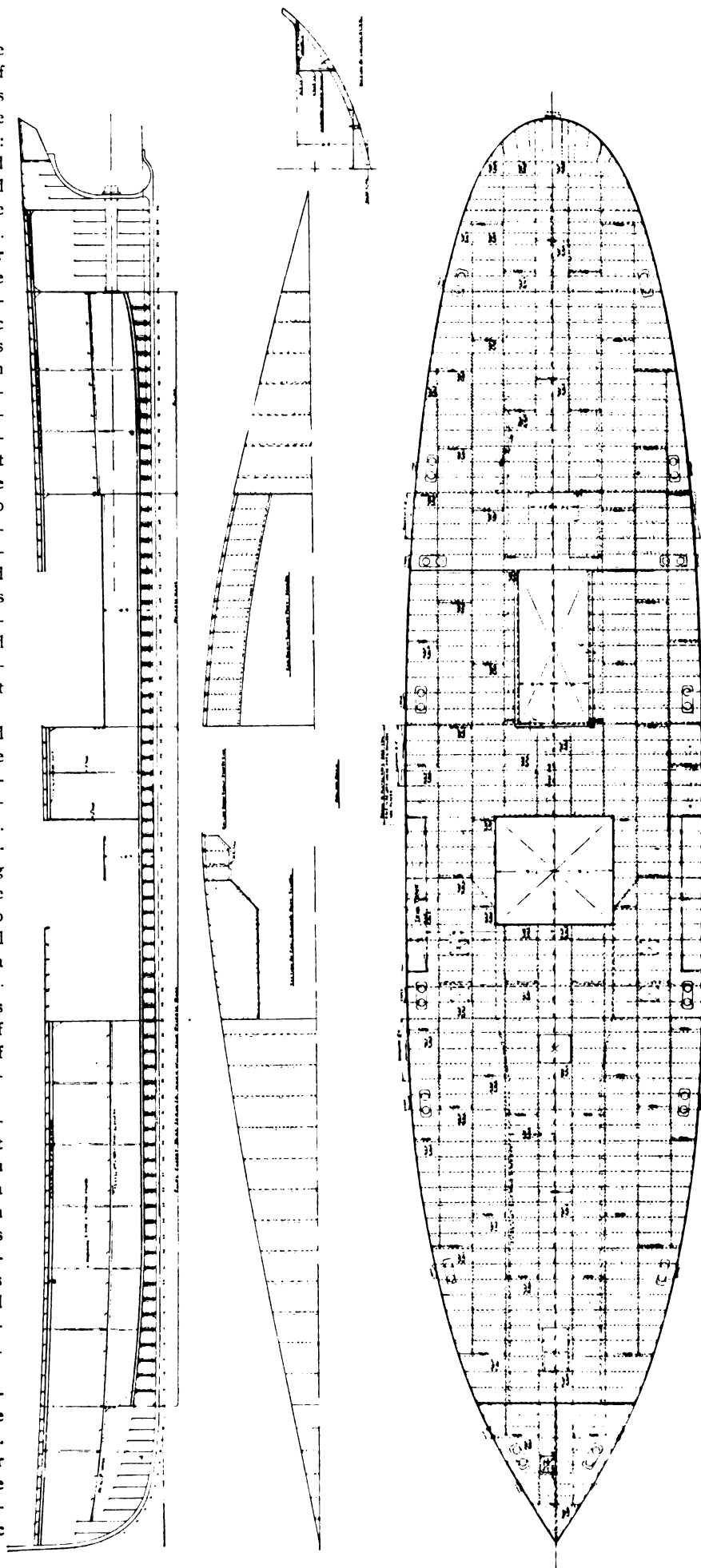
The remedy, therefore, seems to be provision of an efficient fire detecting system, a system which will not only announce the presence of fire, but will forewarn of the approach of fire by announcing a rise in temperature dangerously near the point of ignition. A device of this type which has met with considerable approval, though of comparatively recent adaptation to ship

use, is the automatic alarm of the Montauk Fire Detecting Wire Co., of New York. This appliance consists of a tube thermostat made to operate at three specified temperatures, viz.: 160, 200 and 300 degrees Fahr., and having the porcelain base colored white, red or green, according to the operating point of the enclosed wire. This thermostat consists of a copper conductor coated first with a fusible alloy; second, with a concentric insulation; and third, with a concentric conductor. The core conductor is connected in series with a battery, an annunciating instrument and the concentric conductor, this forming a circuit which is open as long as the concentric insulation is intact. The effect of exposure to heat higher than the critical temperature of the alloy is to cause it to fuse, and, in fusing, to expand. This expansion results in numerous radial lines of alloy being forced through the surrounding insulation. As the insulation contains a fluxing compound, the alloy unites in a soldered connection with the concentric conductor, perfectly closing the circuit at many points.

In the tube thermostat the second conductor consists of a copper tube which, with the insulated core conductor, is placed in the porcelain receptacle or base already mentioned. Within this base the core wire is permanently connected with one binding post, and the tube connected with the other. Such thermostats connected up by common wire with a battery and an annunciating instrument form a circuit complete except for the insulation between each core wire and its tube. Consequently, the puncture of this insulation, in any of a number of thermostats in multiple, closes the circuit.

These thermostats are wired in multiple and are enclosed in steel outlet boxes with covers where installed in cargo spaces or other portions of a vessel where they are subject to rough treatment. All wires for thermostats are carried in iron conduit, the thermostats throughout the cargo holds being arranged to connect to a special fire alarm watertight type of annunciator located in the main engine room.

The Carnegie Institution at Washington has awarded contract to the Tebo Yacht Basin Co., of Brooklyn, N. Y., for the construction of a vessel for the Magnetic Survey Service to be called Carnegie. She is to be constructed throughout of non-magnetic metals.



INBOARD PROFILE AND DECK PLAN OF THE WHITE STAR LINE STEAMER WAUKETA.

Season's Work of Wrecker Favorite

Though the lake season in 1908, commercially considered, was backward, the wrecker Favorite of the Great Lakes Towing Co.'s fleet succeeded in putting in an unusually active year. The Great Lakes Towing Co. is now preparing a brochure upon the wrecker's operations and will issue it in a few days. Much attention has of late years been paid by the Great Lakes Towing Co. to physical equipment, and the results of this policy are certainly apparent. The company is prepared to go anywhere in all weathers, a condition which has proved of inestimable benefit to those engaged in lake trade. For the perfection of this organization, great credit is due to Capt. Edward Smith, who, since he became the head of the company, has made its physical adequacy his chief consideration.

To begin with, the Favorite is one of the most complete wreckers in the world, certainly the most resourceful

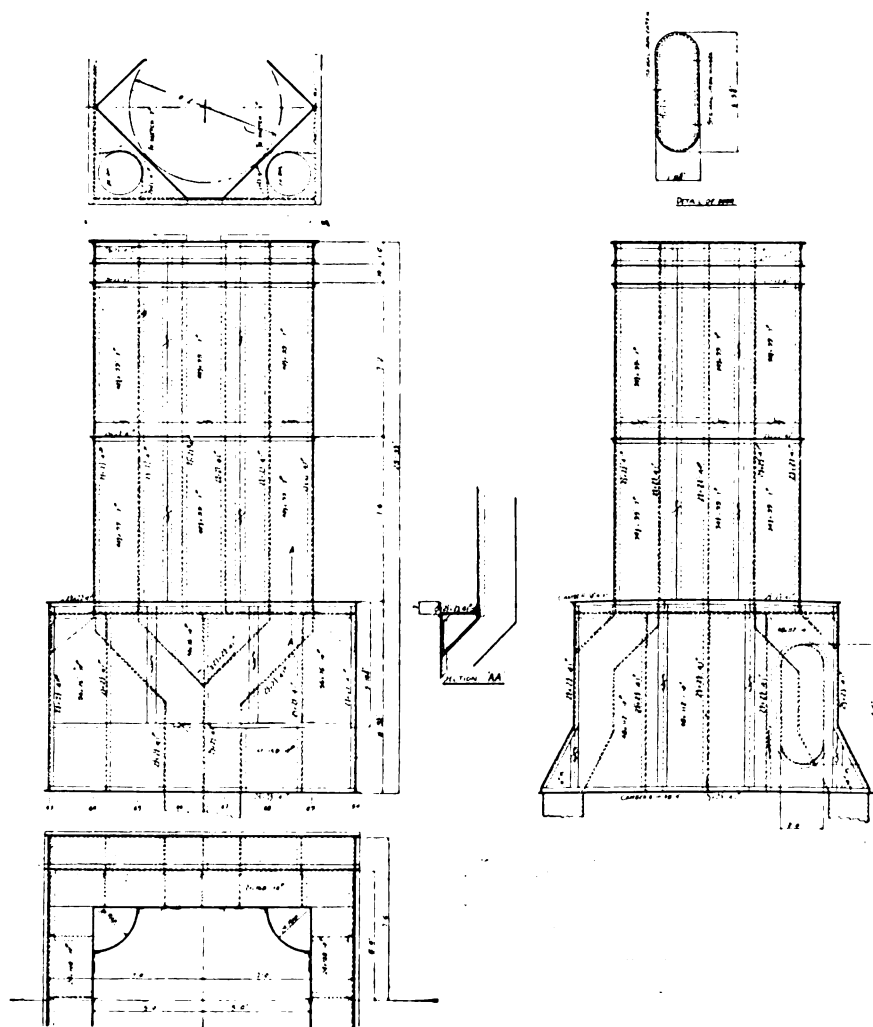
craft that has ever operated on the great lakes. Her equipment includes a large sized punch and shears, electric drills, modern towing machine (the largest built), 1,800 ft. of 2-in. wire line, boom with three-ton ore grab bucket capable of handling 75 tons an hour, a larger bucket capable of handling 90 tons of coal per hour, nine steam pumps, 30 100-ton jacks, four 80-ton purchases with steel cables complete, five air compressors, a complete machine shop, a saw mill with all necessary lumber for constructing cofferdams, and a complete electric light plant to enable her to operate quite as readily at night as by day. She was designed to reduce the cost of wrecking operations to the minimum. That she accomplishes this is reasonably proved by the fact that eight of the most serious wrecks on the lakes during the year were released for a total sum considerably less than the wrecking bill of the

steamer W. E. Reis alone, which went ashore abreast of Harson's Island in the fall of 1907.

The wrecking operations of the Favorite were greatly facilitated by Capt. Alex Cuning's extraordinary capacity as a navigator. The past season was not an easy one for navigators, owing to the fact that they had to operate for weeks together in dense smoke; yet he found his way about in obscure places without once getting the Favorite into trouble. A notable instance of this was the relief of the Arthur H. Hawgood at Cathead Point, Lake Michigan. He had been sent to the relief of the Wawatam, ashore on Poe's Reef, Lake Huron, but discovered that she had released herself about 20 minutes before his arrival. He went to Sheboygan for orders and was told to return to Port Huron. He reached Port Huron at 5:30 P. M., Sept. 23, and found orders awaiting him to proceed to Cathead Point, Lake Michigan, to go to the relief of the Hawgood. He remained only long enough to fuel, leaving Port Huron at 8:30 P. M. Dense smoke overhung the entire lake, but he reached Cathead Point at 9 P. M. the following evening. As the Hawgood did not answer his signals it was midnight before he could feel his way to her. In the interim a car-ferry and the government steamer Hyacinth had been pulling on her without success. He began jettisoning her cargo at midnight and released her at 10 o'clock the next morning apparently in good condition.

The first job of the season was the release of the steamer J. W. Rhoades, ashore in Hammond's Bay, Lake Huron. She stranded on May 22, being out 2 ft. 6 in. forward and 1 ft. aft, with her fore peak filled with water. Air compressors were put aboard, but about 1,500 tons of her cargo had to be lightered before she could be released.

The second job was a steel dredge belonging to the Starke Dredging Co., which sunk at Bar Point, Lake Erie, on June 1. The dredge was totally submerged with one corner of the roof of the house just awash. It was necessary to cofferdam the entire house. The Favorite has a saw mill installed upon her and the cofferdam was constructed out of lumber which she regularly carries as part of her equipment. It took three days to build



PLAN OF STACK CASING OF THE WHITE STAR LINE STEAMER WAUKETA.

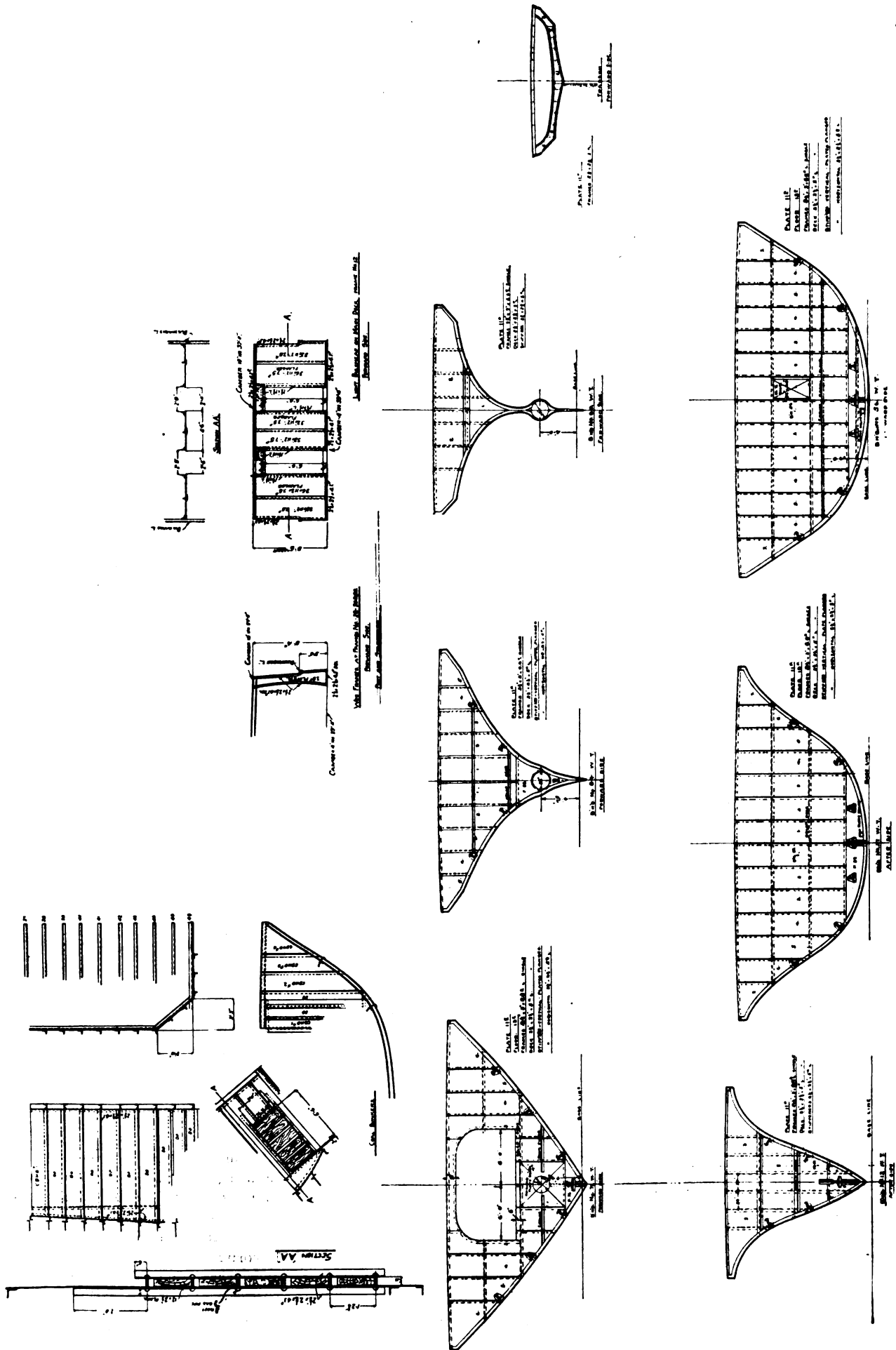


DIAGRAM OF BULKHEADS AND COAL BUNKERS OF THE WHITE STAR LINE STEAMER WAUKETA.

the cofferdam and on June 4 the pumps were put at work and at midnight June 5 the dredge arose, but with a bad list on account of one of her spuds sticking in the mud. This was lifted and the dredge put on an even keel, when she was taken to Detroit by the tug Harding.

The Favorite next went to the relief of the bulk freighter J. J. Boland, which was stranded in the rapids abreast of Point Edward. Capt. Cunning advised lightering, but thought that if the master of the Boland could hold her bow up with anchors that the Favorite might be able to take hold of her stern and pull her off. After breaking the Boland's 12-in. tow line, the Favorite put out 1,800 ft. of wire rope and started to pull with both anchors, but neither the Favorite's nor the Boland's anchors would hold to permit the use of sufficient power to release her. In concluding his report upon this operation Capt. Cuning says: "I then paid out my cable again and took in my anchors, then shortened my cable again until I was within about 150 ft. of the steamer, after which I put my rudder over, and was very much surprised to see the Favorite waltz up stream, abreast of the current alongside of steamer." The Boland was released after 2,500 tons of her cargo of ore had been lightered.

The fourth operation was a little repair job on the barge Bryn Mawr, which had her rudder and quadrant broken by the steamer towing her striking bottom. Repairs to these parts were made in the Favorite's machine shop, Capt. Cuning saying: "In repairing same we used the following parts of equipment: One hydraulic jack, one screw jack, one pneumatic hammer and 6½ hours' use of lathe, 28½ hours with working gang with tools, making repairs in such shape that it enabled barge to continue on her trip."

On July 5 the package freighter Lehigh lost her propeller wheel in the Straits of Mackinaw, and the Favorite was sent to tow her to Chicago.

The next job was the releasing of a steel lighter of 800 tons which sunk in one of the harbors of Lake Erie. She was found in 24 ft. of water, with seams so strained that she resembled a sieve. Three days were spent in cofferdaming, patching and raising her. In these operations two divers, 16 pumps, lumber, canvas and several bales of oakum were used.

The Favorite went to the steamer

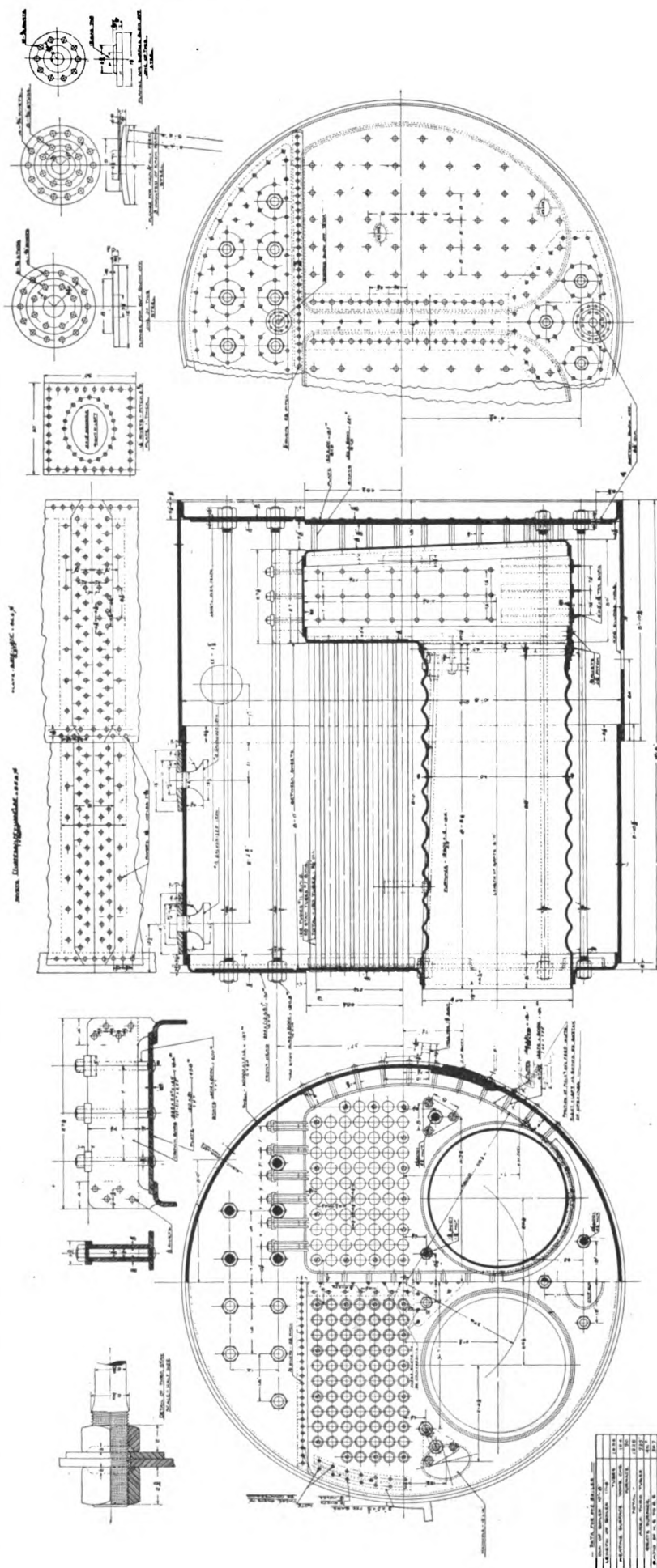


DIAGRAM OF BOILERS OF THE WHITE STAR LINE STEAMER WAUKETA.

Strathcona, stranded in the St. Clair river abreast of Sarnia, on Aug. 12, and pulled her off in two hours.

The next relief was that of the steamer Hoover and Mason, aground on Stag Island, where she lay abreast the current with her shoe gone and propeller wheel disabled. The captain of the Hoover and Mason thought that she could be pulled off, but Capt. Cuning sent for the lighter Rescue on his own responsibility on the understanding that there would be no charge for the lighter's services if she was not used. The tugs Ottawa, Sarnia and Favorite pulled on her without avail. She was released after 500 tons of her cargo had been lightered. The Favorite was then lashed to her quarter to steer her, being towed by the tug Harding. The Favorite had quite a task getting her over the Limekilns but delivered her safely to a steamer in waiting at Bar Point, and lashed her alongside for the trip across Lake Erie.

The Favorite then went to the relief of the steamer Sonora, on Sept. 19, ashore seven miles north of Sand Beach, Lake Huron, with 6,000 tons of ore. The Favorite reached Sand Beach about 10 P. M., in a dense smoke, and found the steamer resting on a shelf rock bottom out 18 in. her entire length with No. 1 compartment on the starboard side and forepeak full of water, also tank No. 2 starboard side leaking. The Favorite began jettisoning at midnight and released the steamer at 6 P. M., after having thrown overboard 800 tons of ore.

On Sept. 21, the Favorite went to Poe's Reef, Lake Huron, to release the Wawatam, but found that she had succeeded in releasing herself. She then went to Sheboygan for orders, returning to Port Huron and making the long run back to Cathead Point without rest for the relief of the Hawgood, as related earlier.

The next job was the release of the package freighter Arthur Orr, ashore on Bois Blanc Island, Straits of Mackinaw. Capt. Cuning attempted to ascertain by telephone the approximate location of this steamer, but could not do so. He left Mackinaw City at 11 P. M., and went half way around the island searching for her, then anchored until daylight owing to the dense smoke prevailing. He found the steamer at 9 A. M., with several small tugs and one large tug pulling on her. He discovered that in pulling they had piled sand around her until there was only 12 ft. of water at any point. He ad-

vised the master to discontinue pulling and to lighter. To this the master agreed and Capt. Cuning telephoned to the Sault for the lighter Reliance, taking the Favorite to Detour to meet her. The smoke prevented the lighter reaching Detour until 2 P. M., in tow of the tug General. The captain of the General remarked that the Favorite might be able to find the south end of Bois Blanc Island in the smoke, but that he personally would not be fool enough to try it. In this connection Capt. Cuning remarks that he has found the Nicholson log pretty reliable, and accordingly took the Reliance in tow and towed her at the rate of 12 miles an hour, checking abreast of the stranded steamer at 6 P. M. He advised the captain of the Orr that that was about all he could do for him, but the captain insisted upon the Favorite's pulling. Capt. Cuning was compelled, however, to leave immediately for Persian Island, Lake Superior, where the steamer Frontenac of the Cleveland-Cliffs Iron Co.'s fleet had stranded.

The Favorite reached Persian Island at 11 A. M., Oct. 29, but could not get alongside the Frontenac until 3 P. M., owing to the heavy sea running. Compressors were put on board and the work of jettisoning began at 6 o'clock and continued until 10 o'clock when they were forced to leave on account of the weather and take the Frontenac's crew with them. The Favorite went into shelter under Whitefish Point at midnight and lay there until 4 P. M., Nov. 1, when she returned to the Frontenac, and succeeded in releasing her at 10 A. M., Nov. 2, and taking her to the Sault.

Meanwhile the steamer Calumet had gone on hard at Stag Island with 7,500 tons of ore. She had been there for several days with a number of vessels working on her. The Favorite went to her assistance and on the first pull pulled off the Calumet's iron tow post. She succeeded in releasing the Calumet in a few hours.

The next wrecking job was that of the Briton, which went on the rocks near Amherstburg. She was pulled off after being lightered. She also went to the relief of the Saxon ashore on Hog Island, but the Saxon had released herself before the Favorite arrived.

Then came a season of great activity with the Favorite's rushing from one stranded vessel to another. The steamer George Stephenson went

ashore five miles east of Round Island on Oct. 22, going on hard with her engine compartment punctured and full of water. The Favorite put a patch over the leak and jettisoned the cargo, meanwhile lowering her power launch to find the steamer that was blowing signals of distress. The steamer could not be located. The Stephenson was released at 4:30 P. M., Oct. 22, the Favorite laying alongside all night and taking her to Mackinaw City on the 23d.

On Oct. 25 the Favorite went to the relief of the City of Genoa, ashore at McGulpin's Point, Straits of Mackinaw, and jettisoned 500 tons of her cargo. She then went to the Crowe, ashore with grain on the rocks near Detour, with her forward hold full of water. The Favorite reached the Crowe at 6 A. M., Oct. 26, and had her released at 3:30 P. M., the same day taking her to Detour. In this case the water had mixed with her cargo of grain, so that both had to be pumped out together. The Favorite's pumps experienced no difficulty in handling the grain.

She then started on Oct. 27 to release the Peshtigo, ashore on Mackinaw Island. She was so badly broken, however, that after working two hours the underwriters ordered her abandoned. The Favorite then went to the steamer Walter Vail, ashore on Round Island, with lumber, reaching her at 8 P. M., Oct. 28, pumping her out and taking her to St. Ignace. She then returned to Round Island and released the barge Connelly Bros., taking her to St. Ignace on Oct. 30.

She also released the Mohawk, ashore on Drummond Island in 9 ft. of water. The lighters had been working on her for five days. Many pirate launches had been made fast to her, seizing the cargo as it jettisoned. When the Favorite pulled the Mohawk came so fast that a number of these craft were overturned.

The last big job of the Favorite was the release of the bulk freighter James E. Davidson, ashore on Kettle Point, Lake Huron. She started on Dec. 14 to jettison the cargo upon order of the underwriters, later lightering to the Wayne, in which work she was engaged until the evening of the 15th when the Wayne was sent to Port Huron on account of threatening weather. The Favorite then started to pull on the Davidson with the tug Harding ahead. They could only swing her around, however, as she

was impaled on one of the numerous rocks that projected through the ledges in this dangerous locality. As a heavy sea began running from the westward, jettisoning was resumed. In this case the Favorite's position was precarious as the heavy seas made her jump three or four feet

with only 17 ft. of water beneath her. At 3:30 o'clock, Dec. 16, the Davidson was released and the Favorite took her to Port Huron without the usual aids to navigation, the ranges and other lights being out.

Her last job of all was raising the tug Yale at Buffalo.

The Michener Automatic Coal Trimming Device for Steamship Bunkers

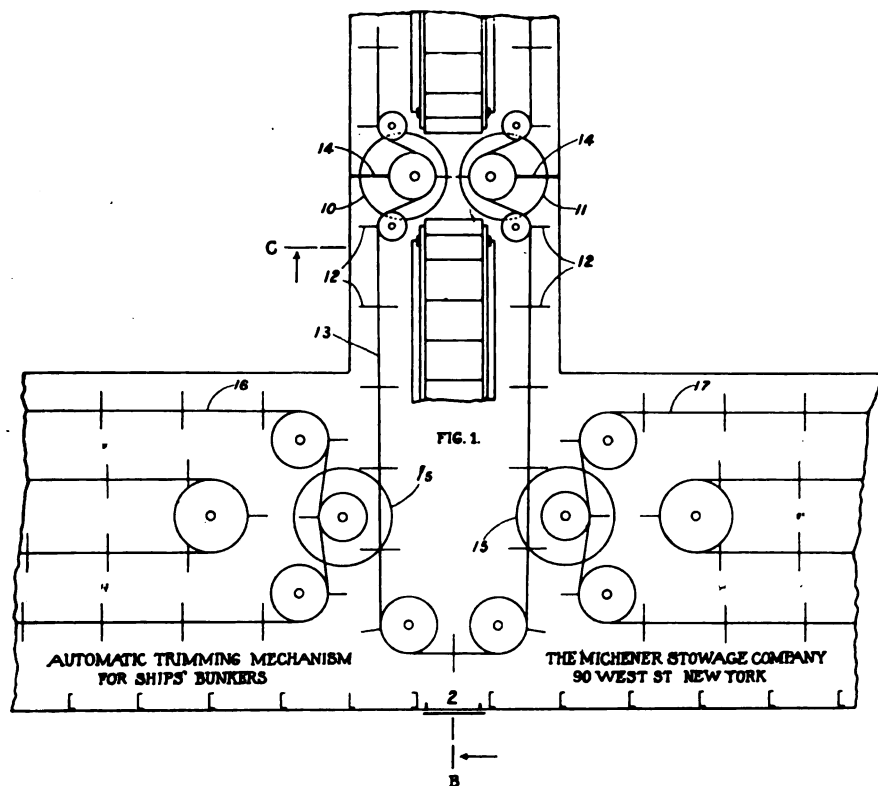
Doubtless one of the most disagreeable features of steam navigation is the coaling problem. Immediately upon the arrival in port of one of our great ocean liners, she must be given over for a series of days to the begriming control of the coal-

evenly in the bunkers so that no space be wasted. It is obvious that this work requires more brawn than brain and that the men employed in such dust-laden atmosphere are inclined to slight their task and to leave many places empty that should be

The urgent need of means for superseding or materially reducing the expense and uncertainty incident to the employment of human labor in coaling ships has long been apparent and the frequent strikes of dock laborers has rendered the elimination of this class of labor for so important a task as coaling almost imperative. With these ends in view inventors have been for many years active in attempting the solution of the various problems involved. Numerous patents have been granted, particularly for apparatus to lift the coal from the barge to the ship's portholes and some of that apparatus has met with more or less success, but until recently practically no means had been devised for trimming the coal within the bunkers and thereby eliminating human labor from a highly obnoxious environment and one in which it is very difficult to induce even the lowest class of men to work.

About a year ago John H. Michener Jr., of Philadelphia and New York, who has been identified with a number of manufacturing enterprises, had these coaling problems brought very forcibly to his attention in connection with a company to which he was giving some of his time. Mr. Michener was so impressed with the needs of this enormous field and the splendid returns that were bound to accrue to anyone who provided even partial relief from the present burdens of coaling ships, that he as promptly as could be retired from the activities in which he was then engaged and forthwith devoted substantially all of his time and energies to the solution of the problem of ships' coaling, particularly the matter of trimming the bunkers. Without going into the details of the months of work expended in originating and developing his ideas and the various discouragements encountered, it is sufficient to state that he at last completed a successful working model, built to a reduced scale, that does so fully accomplish the whole of the desired result that he really feels as though his ambitions in this direction were realized.

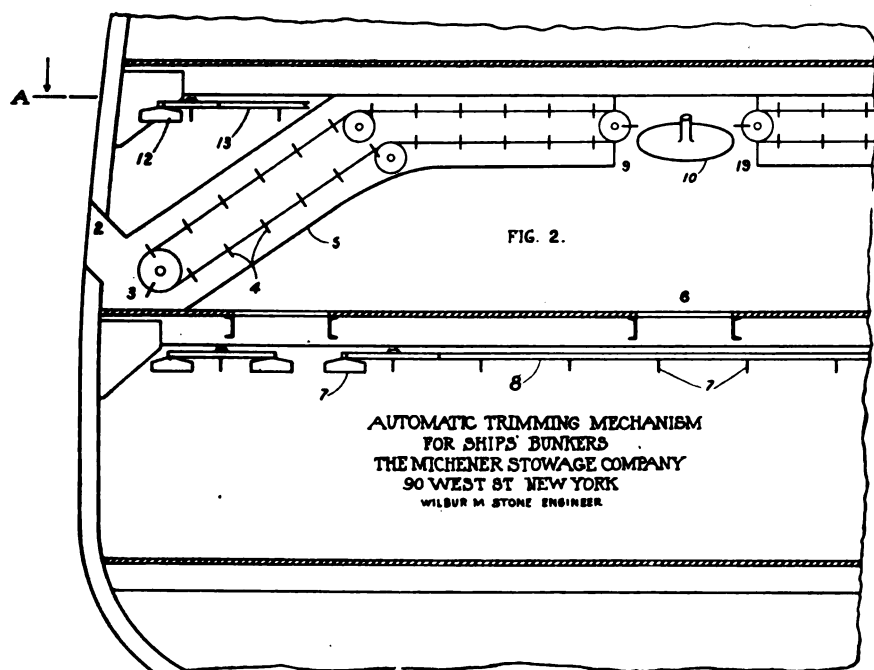
In the diagrams accompanying this article are shown the essential features of the invention, but all details of construction and means for driving have been omitted. Fig. 1 is a plan view just under the deck to which the elevating apparatus is attached and corresponding with the sectional line A of Fig. 2. Fig. 2 is a vertical section through the center of the elevating apparatus



ing gangs. To load, stow and trim her complement of fuel for the return voyage, and often for a round trip, is the first of all important requirement. A vessel can sail without cargo or passengers but not without fuel. It is customary in our large American ports to bring loaded coal barges alongside, both on the off side of the vessel and also between the vessel and the dock, and usually by means of buckets and hoists to raise the coal and dump it into the several coal ports along each side of the vessel. Then gangs of grimy men are sent into the dark and unventilated bunkers to shovel the coal away from the portholes and distribute it

filled with coal. Also the class of men that are willing to do this work contains much of the dregs of humanity and comprises elements that are at times exceedingly difficult to manage.

The enormous increase in the size of ocean steamships during the past 20 years has of course increased their coal consuming capacity proportionately. The well nigh insatiable greed of their furnaces has brought the coaling problem to an acute condition and the dock superintendent and ship's officers always feel a definite load lifted from their shoulders when their complement of coal is safely loaded and trimmed.



and corresponding with the sectional line B of Fig. 1. Fig. 3 is a cross sectional elevation on line C of Fig. 1. In these diagrams the Michener apparatus is illustrated as serving an H shaped bunker running entirely across the vessel and then in each direction along the outboard side of the boat. One of the great features of economy of this device is its ability to take all the coal from the off side, thereby permitting the boat to lie close against the dock. This reduces materially the cost of loading and unloading cargo and keeps the dirt and dust away from all cargo handling. The coal is introduced through a single porthole 2 and directly into the receiving foot of the elevator 3. This elevator, contrary to the usual method of elevating materials, is under-fed and its rectangular plate-like blades 4 scrape the coal up along a boot or bottom 5. It will be observed that this boot is located a material distance from the edge of the flights 4 so that those flights have a soft bed of coal under them at all times.

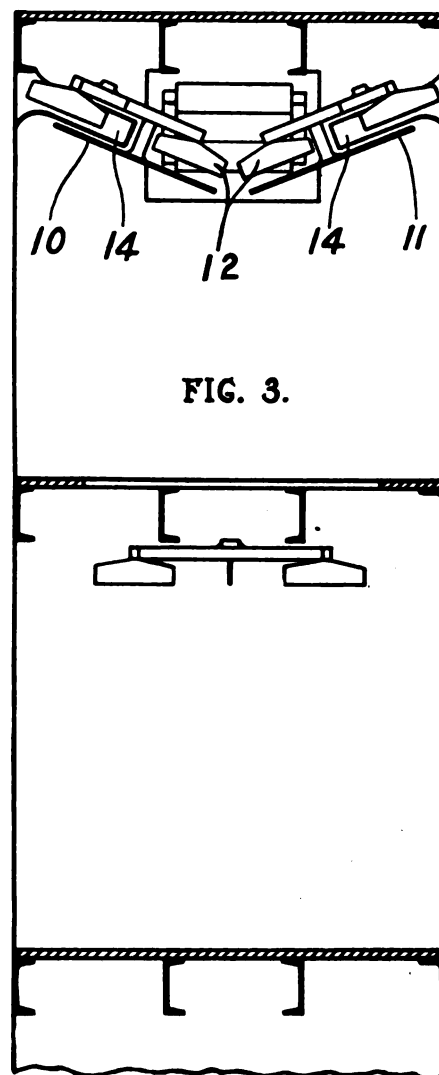
One feature of high importance in coaling ships is that not only the bunkers be evenly trimmed but that during the coaling the vessel itself must be kept trimmed. To this end the elevator of the Michener apparatus carries the coal not only up to the top of the bunker but over to the middle of the vessel and there deposits it in a conical pile which falls through the deck opening 6 into the lower bunker if the vessel is equipped with a two-decked bunker. When the pile of coal has accumulated sufficiently in the lower bunker, it

is attacked by the blades or flights 7 of a horizontally arranged chain operated at a suitable speed and which continually scrapes off the top of the accumulating pile and spreads it farther and farther from the point of delivery. When the primary trimming member at 8 has trimmed the coal within the reach of its travel, the surplus coal is delivered to other trimming units by means of an ingenious device which will be described more in detail presently. Assuming that the lower bunker has been entirely filled, we will turn our attention now to the upper bunker.

As the pile of coal accumulates in the middle of the upper bunker under the point of delivery 9 of the elevator, the coal will presently be dumped upon the transfer discs 10 and 11 lying between the delivery ends of elevators 9 and 19. It will of course be understood that only one of the elevators 9, 19 is used at a time, the elevator in use being the one that serves the off side of the ship. The rotation of these discs carries the coal dumped on them upwardly and away from the point of delivery and into the path of the flights as 12 of the horizontal trimming member 13. The scraper blades as 14 are arranged above the discs to prevent the coal being carried around and around. When the accumulating pile of coal has been distributed nearly to the ends of the cross bunker, it will be delivered to horizontally arranged transfer discs 15 by which it is in turn delivered to other trimming chains 16, 17, having flights similar to flights 12 of chain

13. These trimming chains, 16 and 17, run lengthwise the vessel to the extreme ends of the bunkers and steadily scrape the coal delivered to them to the extreme ends, corners and middle of the bunkers, filling them evenly full and that without any manual assistance whatever.

The various conveyor and transfer units are all handleable for starting and stopping from one switch-board, and are provided with mechanism so that when any bunker portion is filled



the fact is indicated automatically to the man in charge so that that particular element or unit can be stopped. The arrangement of these trimming units is such that the coal will be carried first to the extreme ends of the various bunkers and the last portion to be filled will be that nearest the point of delivery into the bunker.

The simplicity of construction and ease of installation makes this apparatus applicable to vessels already afloat, while its adaptability to long, narrow spaces opens new fields for

The working parts are gotten up with a view to their requiring the minimum amount of attention and when the valves are once set, the engineer does not have to worry about the location of his cams or eccentrics.

In the words of one of the users, who wrote this firm recently, the ease of handling these engines with this device is nicely illustrated. He says, among other things, "Your engines are powerful, noiseless and the manner of adjustment is perfect, and any kid with brains enough to use an oil can is competent to run them."

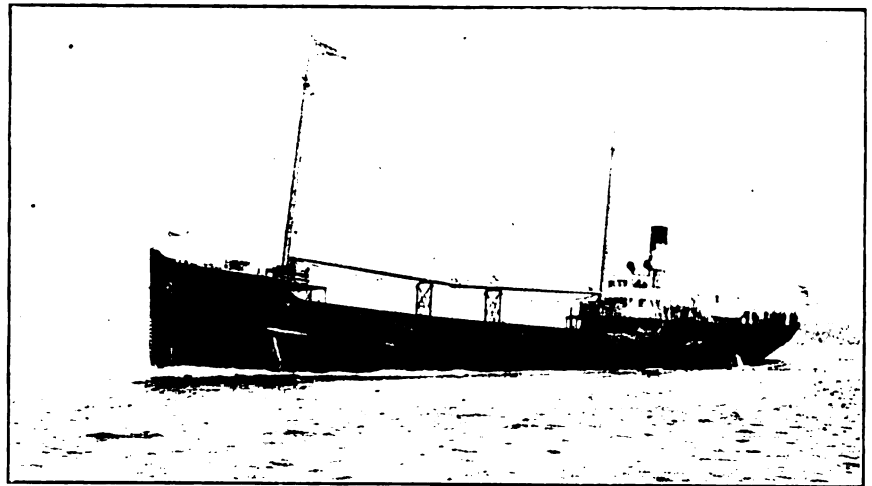
Gillett & Eaton are in position to build these engines in any size from 4 in. x 30 in. to 24 in. x 12 ft. and in the various sizes of cross and tandem compound.

They are making a specialty of this class of machinery and by embodying the experience of others, which they have had access to, with their own extensive experience, they are in position to know to the detail the requirements, in every respect, pertaining to this class of machinery.

They also manufacture in combination with these, a number of steamboat accessories such as pumps, capstans, heaters, etc.

STEEL BULK FREIGHT COAST-ING STEAMER RIVERSIDE.

The coastwise lumber and bulk freight cargoes of the Pacific coast are carried mainly in three styles

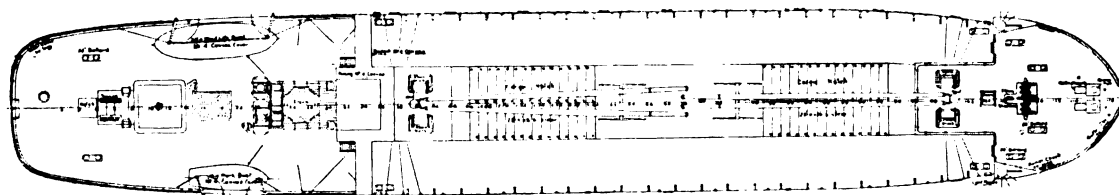
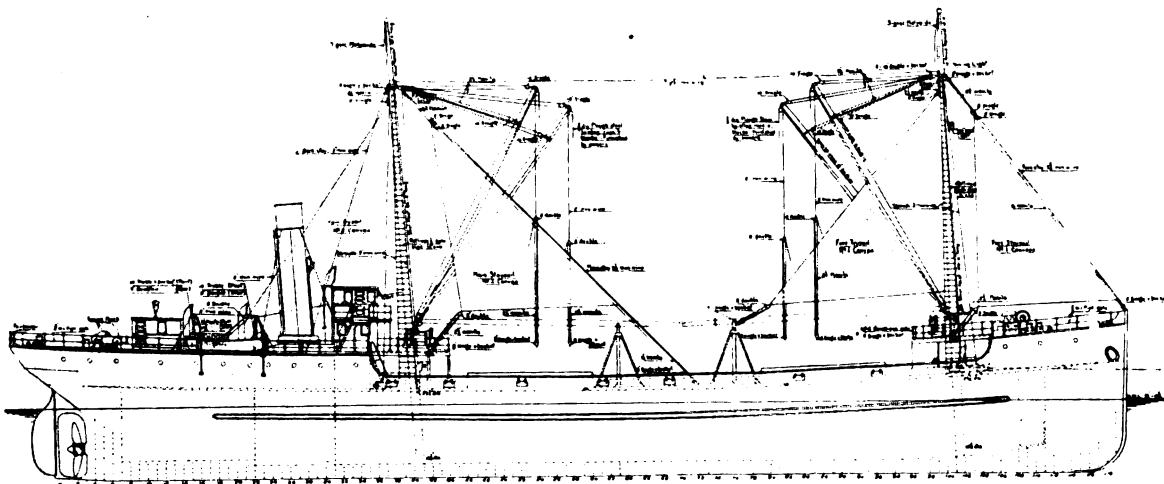


SINGLE DECK STEEL FREIGHT STEAMSHIP RIVERSIDE, BUILT BY THE MORAN CO., SEATTLE.

of ships: wooden sailing schooners, wooden steam schooners and steel bulk-freight steamships. For years the large majority of the freight was carried by the sailing craft; later the wooden steam schooner became the dominant factor in the trade while recently the steel steamship has appeared. Bitter controversy has raged regarding the relative merits of these three types of cargo carriers, the discussion being most active with respect to the wooden steam schooner and its later steam built rival. It is not the purpose of this article to go into the details of this debate, but to present in a brief description the salient features of one

of the most up to date of the Pacific coast steel bulk freight steamships. In two short articles which will follow this one, the chief characteristics of a representative wooden steam schooner and sailing schooner will be presented. The series will then close with a discussion of the relative merits of the three types of vessel for the Pacific coast cargo trade.

The vessel described and illustrated in this article is the steel steamship Riverside, built by The Moran Co., Seattle, for the Charles Nelson Co., San Francisco. She is the last of a group of very similar boats built by The Moran Co in 1907 and 1908,



RIGGING PLAN OF THE PUGET SOUND STEAMER RIVERSIDE.

Overall Dimensions
Length 100 ft.
Beam 20 ft.
Draft 10 ft.
Displacement 1,000 tons

the other two being the Stanley Dollar and the Falcon. The Riverside was placed in commission in September, 1908, and has since been engaged in the coastwise lumber traffic.

The Riverside is a single deck bulk freighter with two cargo hatches, each 28 ft. by 16 ft., 6 in. in the clear. Her type is very similar to that of the smaller bulk freighters that have proven so popular on the great lakes. She has a raised deck forward, a main deck free and clear for cargo handling; her engines, boilers and cabins are all located compactly aft; there are two masts with two derrick booms on each mast; the booms on the foremast cover the forward hatch and those on the rear mast the after hatch.

The hull is of steel with double bottom, 252 ft. 5 in. in length over all, 241 ft., 6 in. in length between perpendiculars, 41 ft. molded beam and 19 ft., 3 in. molded depth. Her load water line draught is 16 ft., 6 in., her freeboard 4 ft. and full load displacement 2,300 tons. She registers 1,783 gross tons and 955 net and has a cargo capacity of 1,500,000 ft. B. M. of lumber. In model she has a good wave line, a well rounded stern and in general is more shapely than the average cargo steamer.

Steam is furnished at 180 pounds per square inch pressure by two Scotch marine boilers with a total heating surface of 2,816 square feet and a combined grate area of 93.8 square feet. The furnaces are fitted to burn oil and a fuel oil capacity of 2,700 barrels is provided. This gives a sailing radius of 5,400 nautical miles at eight knots an hour, the fuel consumption being 98 to 100 barrels on an average 24-hour run of 200 knots. These barrels contain 42 United States gallons each.

Triple expansion engines of 1,300 indicated horsepower at 99 revolutions per minute and 185 pounds boiler pressure are installed. The engines were designed and built by The Moran Co. The cylinder dimensions are 17, 28 and 47½ inches in diameter by 36 inches stroke. The engines are coupled to a single screw 12 ft., 6 in. in diameter, with a mean pitch of 13 ft., 6 in.

The Riverside carries a crew of 21 men, distributed as follows: One master, two mates, three engineers, three firemen, two oilers and 10 deck hands.

Her speed on her builders' trial was 11.76 miles per hour at 99 revolutions per minute. Her ordinary

cruising speed is eight knots. She represents the highest development of the Pacific coast single deck steel bulk freighter and an investment of \$180,000.

TUG HERBERT.

The tug Herbert illustrated herewith was launched July 28, 1908, from Johnston Bros. yard, Ferrysburg, Mich., and was built for G. Mollhagen & Co., St. Joseph, Mich., for the fishing trade. The Herbert is 76 ft. over all, 15 ft. 6 in. beam, 7 ft. 8 in. mold-

ed depth. The bids, which were opened Dec. 15, were as follows: William Cramp & Sons Ship & Engine Building Co., Philadelphia, Pa., class 1, \$805,000; class 2, \$775,000; time, 20 months. Newport News Ship Building & Dry Dock Co., Newport News, Va., class 1, \$790,000; class 2, \$825,000; time, 16 months. Fore River Ship Building Co., Quincy Mass., class 1, \$933,000; class 2, \$954,000; time, 15 months. New York Ship Building Co., Camden, N. J., \$1,074,000; if Lidgerwood coal apparatus is installed,

REPAIRING

The Moore & Co. of San Francisco, Cal., has secured a contract for repairs to the transport Thomas, both engines as well as to considerable carpenter and joinery work. The bids on the hull and engine repairs were as follows: M. J. Scott, \$2,196; Keer & Lloyd, \$3,739; United Engineering Works, \$3,650; W. A. Boole & Son, \$3,739; Iron Works, \$3,650; Risdon Works, \$3,600. All of these firms are located at San Francisco.

AWARD FOR COLLIER.

The William Cramp & Son Ship & Engine Building Co., Philadelphia, Pa., has been awarded the contract for building a naval collier on its bid of \$775,000 as authorized by congress in

Assembly Rooms for Lake Seamen

The first of the assembly rooms for men aboard ship to be established under the provisions of the co-operative plan of the Lake Carriers' Association was opened in Cleveland on New Year's day. That the committee has done well is abundantly proved by an inspection of the quarters. They are all that any one could require. The assembly rooms have been fitted up in conjunction with the shipping



ASSEMBLY ROOM IN CONJUNCTION WITH THE OFFICE AT CLEVELAND.

relieve any temporary distress, and this he can have as part of his right,

A convenience which the men will doubtless appreciate is the baggage room. This is of generous dimensions and is intended to care for the effects of the men at all times. They may leave their effects there permanently and may have access to them at any moment. The baggage room adjoins the lavatory, so that the men have every convenience to bathe and change their wearing apparel.

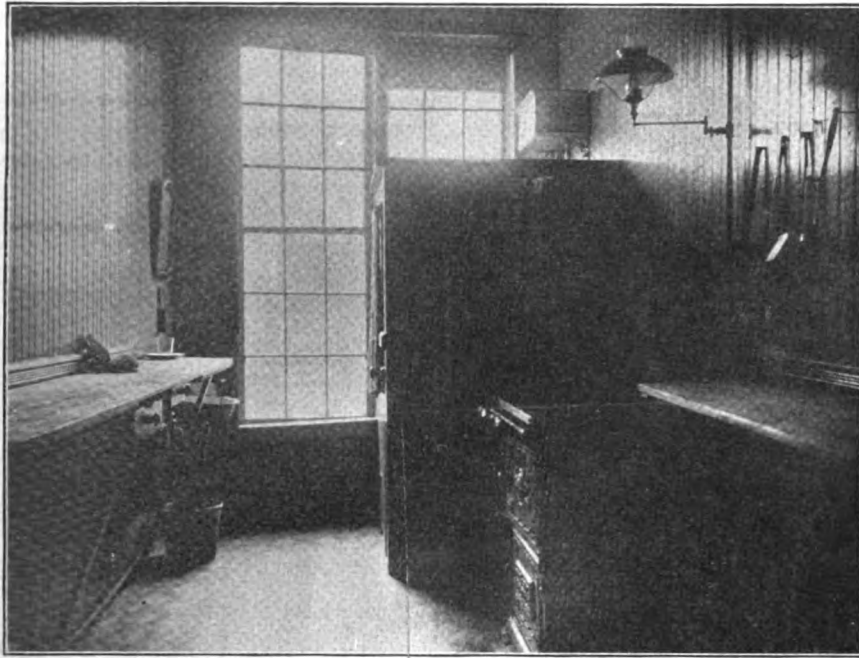
The shipping commissioner's assistants will make a special point of seeing that all mail is properly forwarded. The assembly rooms are essentially clubs and the object is to provide in them all the ordinary conveniences of club life. All these facilities are provided for 8½ cents a month or \$1 per year.

It is quite gratifying to note that while the rooms in Cleveland have been open only for a week, they are already well patronized and that at any time of the day from 40 to 50 men are to be found in them, either reading, writing or playing cards. Quite a number have already established it a practice to go there the first thing in the morning and shave and wash and prepare for the day, as the conveniences of the rooms are much greater than are to be found in the ordinary lodging house.

Mr. J. H. Sheadle, vice president of the Lake Carriers' Association, has



F. WALL IN HIS OFFICE AT THE ASSEMBLY ROOMS.



GALLEY AT THE ASSEMBLY ROOM.

taken great personal interest in the fitting up of the assembly rooms and as rapidly as it can be brought about the assembly rooms will be opened at Detroit, Buffalo, Chicago and other leading ports.

HISTORIC FERRY CEASES TO OPERATE.

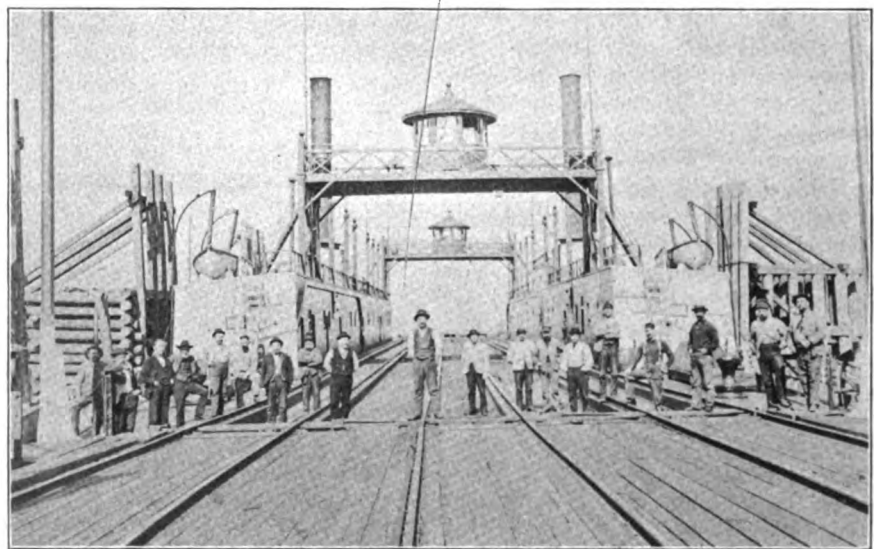
The steam train ferry Tacoma, which for over 25 years has ferried the Northern Pacific trains across the Columbia river between Kalama, Wash. and Goble, Ore., without a mishap, made her last trip on Christmas day. Northern Pacific trains between Puget Sound and Portland will hereafter use the splendid new double steel track bridge at Vancouver, Wash. It has not been definitely determined what will be done with the old ferry, but it is positively asserted that she will be operated no longer. If possible she will be sold for heavy ferrying service or as a barge; failing this she may be broken up.

The steam ferry Tacoma was built of wood in 1884. Although nominally owned by G. A. Gove, Kalama, Wash., she was in reality controlled by the Northern Pacific railway. She has a length of 334 ft. and a beam of 42 ft. Her gross tonnage is 1,362 and net 1,311. She is equipped with three tracks and has a capacity of a train of 15 passenger cars and a locomotive. She has independently operated side paddle wheels. At the time she

was constructed she was considered cheaper, fixed charges considered, than a bridge across the river. The growth of traffic has changed all this and made the bridge a necessity. With one exception, she is claimed to be the largest train ferry in the world.

The Tacoma has the unique record of having been in continuous service since she was built, ferrying trains night and day, year in and year out, without the slightest injury to the vessel or its cargo. It is a record of which her master is justly proud.

We publish herewith an interesting photograph of the Tacoma and her crew which was taken 12 years ago and shows her as she was in her palmy days.



STEAM TRAIN FERRY TACOMA. FROM A PHOTOGRAPH TAKEN 12 YEARS AGO.

SHIP YARD NOTES.

Sloan Bros., Seattle, Wash., are lengthening the steamer Vashon 20 ft. and installing twice the power she formerly had.

Booz Bros., Baltimore, Md., are overhauling the schooner W. H. Dix, owned by Dix & Wilkins, Baltimore, preparatory to a trip to the Spanish main.

The Diamond Jo Line Steamers is repairing the stern-wheel steamer Eclipse at its yard at Dubuque, Ia. She will also be lengthened, 12 ft. being added at the bow.

The Chesapeake Marine Railway, Baltimore, Md., is building an open lighter for the Mutual Chemical Co. of America. The vessel is 76 ft. long, 22 ft. beam and 6½ ft. deep.

The Merrill-Stevens Co., Jacksonville, Fla., has been awarded a contract for overhauling the dredge Savannah, owned by the engineers' department, United States army.

Crawford & Reid, Tacoma, Wash., have recently launched a fishing steamer built to the order of Weeding Bros., of Seattle, Wash. She is for service in the halibut fishing trade.

The Kelley-Spear Co., Bath, Me., has recently laid the keel for an ocean-going tug boat which it is to build for the Commercial Towboat Co. of Boston, Mass.

The Marine Railway, Machine & Boiler Works, Baltimore, Md., has been awarded a contract for overhauling the United States coast survey steamer Bache.

The Skinner Ship Building & Dry Dock Co., Baltimore, Md., has been awarded a contract for making repairs and alterations to the oil barge

Dallas, owned by the Texas Oil Co. The work will include new cofferdams, the removal of the tank tops and considerable other work. There were 13 bids submitted for making the repairs.

J. Ernst & Son, Mahone Bay, Nova Scotia, are building a cargo steamer for J. F. Rhude, of Halifax, N. S., to be 90 ft. on keel, 105 ft. over all, 20 ft. beam and 9 ft. depth of hold.

Rice Bros., Boothbay, Me., have under construction over 30 knockabouts, 12 of which are for members of the Manchester, Mass., Yacht Club, the remainder being for various owners. They are of similar design.

Charles L. Rohde & Sons' Co., Baltimore, Md., are building a sand and bucket dredge for Baltimore owners. The vessel is now in frame and is to be 90 ft. long, 32 ft. beam and 9 ft. deep.

F. W. Pickles & Co., Annapolis, Nova Scotia, have purchased a site of 16 acres on the water front where a ship yard will be established. Early in the new year they will begin the construction of a four-masted schooner.

William Cramp & Sons Ship & Engine building Co., Philadelphia, Pa., is to lengthen the tank steamship Toledo, owned by the Sun Oil Co., of Philadelphia, so soon as work has been completed on the lengthening of the tanker Paraguay, owned also by the Sun company.

The Ollinger & Bruce Dry Dock Co., Mobile, Ala., has been awarded a contract for making repairs to the lighthouse tender Arbutus on its bid of \$3,026.77. One other bid was submitted, that of the Gulf Dry Dock Co., Mobile, Ala., for \$3,091.09.

Cook & Lake, Ballard, Wash., have begun the construction of a river steamer and two barges for the Alaska Commercial Co., of Seattle. The steamer is to be 110 ft. in length and the barges will be one 100 ft. and the other 65 ft. in length, the larger having a beam of 30 ft.

Cobb, Butler & Co., Rockland, Me., launched the four-masted double-decked schooner Stanley M. Seaman on Dec. 22. She is owned by Donnell & McKown, of Boston, and will be operated in the coastwise and Porto Rican trade. The Seaman is 189 ft. long, 39.4 ft. beam and 1,050 tons.

Oliver Gildersleeve & Sons, Gildersleeve, Conn., launched a wooden coal barge recently for stock. It is 116 ft. long, 30 ft. beam and 12½ ft. deep and measures 382 gross tons. It is valued approximately at \$7,500. At the same yard a coal barge 121 ft. long, 30 ft. beam and 12½ ft. deep

was also launched last month. She is for stock and is valued at approximately \$8,500. She measures 406 gross tons.

The Fore River Ship Building Co., Quincy, Mass., has recently completed the third of the large steel floats which it has built for the New York, New Haven & Hartford Railroad Co., for use in carrying freight cars in New York harbor. The float is 337 ft. long, 40 ft. wide and is capable of carrying 27 or 28 loaded freight cars.

The New York Ship Building Co., Camden, N. J., has given a contract to the Penn Steel Casting Co., of Chester, Pa., for castings to be used in the construction of the battleship Utah. This is a large order and will keep the Penn works busy for some time. It calls for about 1,000,000 lb. of steel.

The steel hull towboat built by the American Bridge Co. at Ambridge, Pa., for the Angola Transfer Co., of Angola, La., will be towed to Cincinnati as soon as the stage of the river will permit where she will receive her machinery. This is being furnished by the Charles Barnes Co., of that city. The cabin will also be built on the boat at Cincinnati.

EVERLASTING VALVE.

The Everlasting valve, of which the Scully Steel & Iron Co., Chicago, are general distributors, is specially designed for blow-off service. The valve is largely used where a strong, substantial and dependable article is necessary. The valve needs no attention whatsoever from the engineer after being installed, being perfectly self-grinding and self-compensating at all points.

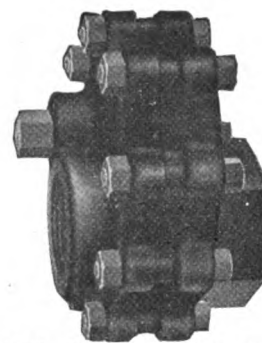
The valve is composed of a top and bottom bonnet, a disc and a lever and post, and is so simple that an inspection of the cut explains its entire operation.

A wrench is placed upon the square head at "a" and pushed down, opening the valve, and reversed to close it; the effort to open it being in the 2-in. size, about 25 lbs. on an 8-in. lever against 200 lbs. steam pressure (about one-fifth that necessary to operate most plug cocks).

The two bonnets are set together upon an approved high pressure gasket with machine bolts, giving quick access to the inside, should it ever be necessary to renew the disc or reface the seat. A glance at the cut will show how easily the entire working part of the valve may be renewed and refaced—a monkey

wrench and file being the only tools needed—and we want to ask the practical engineer if any other valve offers the same facility for repair? This feature is made possible, however, by the simplicity of the whole apparatus.

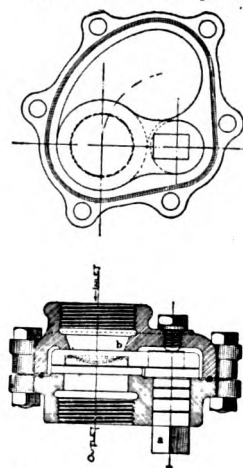
The operating post is set tight upon a ground joint and held there by a stiff bronze spring, thus doing away with a stuffing-box entirely, and making it perfectly tight as long as the valve lasts. It need never



THE VALVE THAT OPERATES WITH EASE AND STAYS TIGHT.

be touched after leaving our hands as it constantly grinds itself to an absolutely true seat at each operation. In practice we find it never has to be touched during the life of the valve.

It will be further noticed that the inlet orifice is tapered just above the seat at "b;" this increases the velocity of the "blast" at this point and in-



TELLS THE HOW OF IT.

sure its delivery into the discharge pipe without punishment to the seat as would be the case were this precaution not taken. It also has the effect of siphoning the valve clean at each operation.

The clearance spaces within the valve have been made ample to avoid the possibility of clogging, and numerous tests prove that the valve will work as well discharging mud or putty as it will with pure water.

**"WISDOM IS KNOWING WHAT
TO DO NEXT, VIRTUE IS
DOING IT."**

DAVID S. JORDAN.

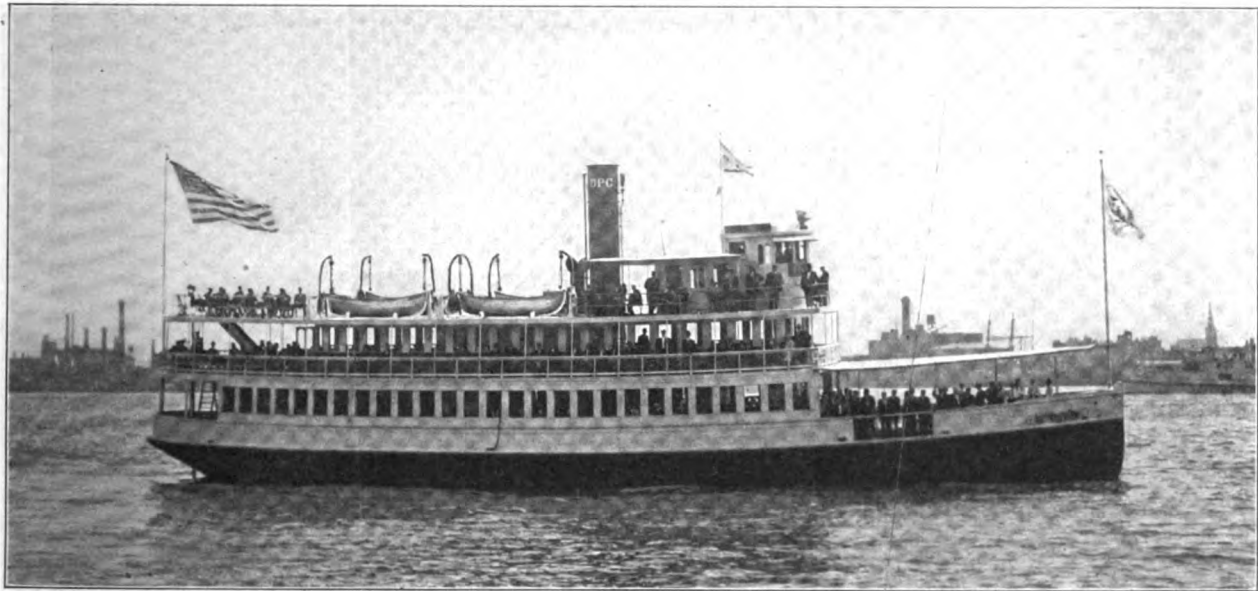
In a recently issued general rules and regulations prescribed by the board of supervising inspectors, of the steamboat inspection service, as approved by the secretary of commerce and labor on Sept. 5, rule 3, section 4 contains the following: "All lifeboats shall be fitted with such davits and gear as will enable the boats to be safely launched in less than two minutes from the time the clearing away of the boats is begun." Although during the last few years the rules regarding the construction of lifeboats and rafts have been amended

will involve an extra cost of only the very smallest fractional percentage of the total cost of the ship. Although the matter of life-saving appliances has received some considerable attention through our columns some further comments on the subject will not seem amiss at this season of the year.

From past experience we know that a lifeboat or raft is of little or no use if same cannot be safely and quickly launched when needed, and in conjunction herewith would emphasize a few of the principal requirements of an ideal system of lifeboat davits in effecting the safe launching of lifeboats. In doing this we wish to recall

of the Larchmont's eight boats reached Block Island."

In the case of the ill-fated Columbia, on the Pacific coast last year, the surviving second officer testified with others that the reason the starboard lifeboats could not be launched was that the ship took a heavy list to port immediately after the collision. We can go even further back to one of the most appalling disasters in the annals of the trans-Atlantic service,—the loss of the French liner La Burgoyne. There the principal cause of the great loss of life was the frantic and successful efforts of the passengers to enter the lifeboats before they were raised and swung clear of the ship's side; it will be



STEAMBOAT LOWELL OF THE DEPARTMENT OF PUBLIC CHARITIES, NEW YORK CITY.

from time to time, in order to insure such craft coming from the hands of the builders as seaworthy as possible, this is the first time, strange as it may seem, that a limit has been set on the time necessary to launch the same.

When building a ship the owners and builders endeavor to have each detail of construction and fitting as near perfection as possible. In meeting the demand for speed and comfort, however, life-saving appliances have received but cursory attention, and it is only when some shipping disaster accompanied with great loss of life brings the matter forcibly to the owners' notice that life-saving equipment gets the consideration it merits. The demand for better safety appliances made by the steamboat inspection service has increased from year to year, yet the best in this line

a few incidents of shipwreck, such as the Slocum disaster, when Captain William Van Schaick, at the investigation, testified that there were but seven men in the crew of the General Slocum and that six men were required to launch a lifeboat properly. Again, in the case of the steamer Larchmont, the report of the steamboat inspection service contained the following: "While it is true that the Larchmont was equipped with boats and rafts in excess of lawful requirements, only a sufficient proportion of her boats to cover the boatage prescribed for passenger steamers of her tonnage was efficiently davited. It is therefore necessary that the surplus boats be handled by davits provided to raise, swing out and lower her prescribed complement of lifeboats, and this, in our opinion, accounts for the fact that only five

remembered that when the crew tried to drive the terror-stricken occupants from the boats they were accused of themselves desiring to occupy them.

These contribute but a few typical experiences where under usual conditions an insufficient and incompetent crew, insufficient davits, a listed vessel and panic-stricken passengers, jointly or separately may swell the list of casualties which at intervals shock and horrify the world.

Inasmuch as we believe that there are ship owners, builders and architects who will find themselves somewhat at a loss as to how best to conform with the aforementioned rules and requirements we would again take the opportunity to draw their attention to the Welin quadrant davit, which, so far as we know, is the only davit on the market that can overcome these difficulties, par-

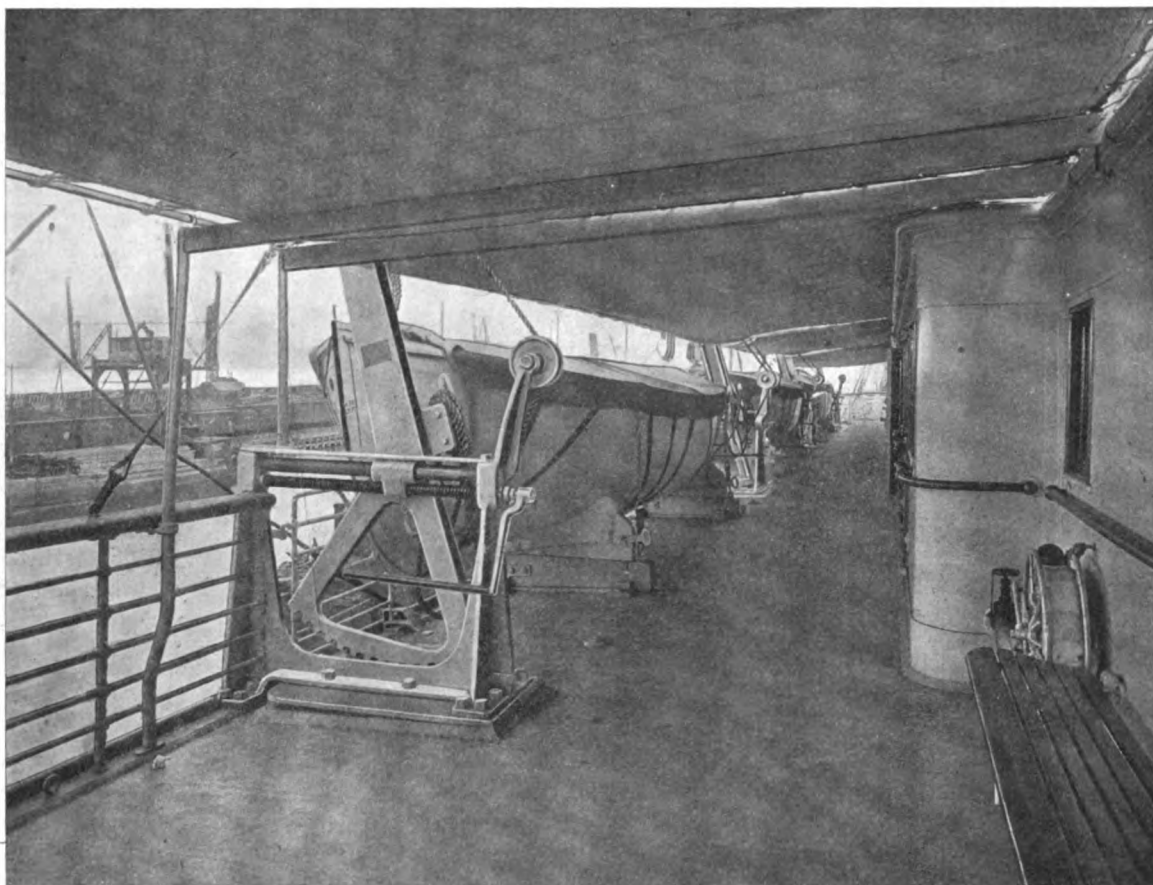
ticularly when the ship is under way at sea, subject to heavy rolling and pitching, in addition to the conditions above mentioned. The principal advantages with this device are that lifeboats can under all circumstances be under efficient control, even a sudden list of the ship not appreciably retarding the manipulation of the same. Two men can always manipulate and launch a lifeboat whether it be empty or loaded with its full complement of passengers and crew, the mechanism being of the simplest possible nature and manner of manipulation such that no previous train-

in their contracts. Consequently, these davits, so far as the building of ocean-going ships are concerned, now appear to be as much a part of the construction as the plating or decks.

Some of our architects and builders have hesitated somewhat to adopt this gear on account of their fear that the ordinary light decks and scantling would not be sufficiently strong to carry the same on harbor and river boats. That this fear is altogether groundless can best be proven by the many types of boats already fitted, such as the steamboat "The Lowell," shown in the ac-

weight and in appearance are more trim and shipshape than anything else of their kind in the market.

In conclusion we wish to mention an incident, both apropos and amusing, recently related by the captain of a trans-Atlantic liner equipped with this gear. On this vessel the Welin quadrant davits are installed on the boat deck proper, two boats situated aft on skids being equipped with ordinary round-bar davits. The captain relates the following: "On one trip from New York I had amongst my passengers a typical farmer from one of the far inland



BOAT DECK ON S. S. COLON, SHOWING BOATS CHOCKED HALF OUTBOARD, WHEREBY 330 SQ. FT. OF DECK SPACE IS SAVED ON EACH SIDE

ing on the part of the crew is necessary.

That this device has been recognized as the best of its kind throughout the maritime world can best be proven by the fact that during the past two years—or since this davit was placed on the market—more than 200 ships of all nationalities and classes have been equipped with the davit, and we are informed that out of 28 ships contracted for abroad during the last few months 24 have the Welin quadrant davit specified

accompanying photograph. The deck of "The Lowell" is of only seven-eighths of an inch pine, tongued and grooved, with light ordinary carlines, supported on the outboard side by $2\frac{3}{4}$ -inch turned wooden stanchions.

The weight of these davits is considerably less than that of the old solid round-bar davit, the reason being that the principal parts are made of best open-hearth cast steel, with the running parts of Tobin bronze. They are shaped to combine the maximum strength with the minimum

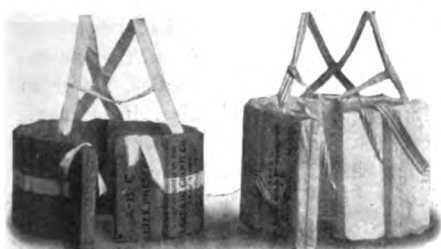
weight. This gentleman seemed to take great interest in everything pertaining to ship handling and equipment and asked me innumerable questions. One day I came on him standing looking aft at the lifeboats on the skids and he immediately asked me how we managed to get those boats over the side. I explained how this could be done and in turn asked my farmer friend why he did not wish to have the manipulation of the davits on the boat deck explained. His reply was brief and to the point.

'Oh, that's easy,' he laughingly answered, 'I know how to turn a crank myself.'

No doubt a certain sense of security is derived by the passenger not acquainted with ship equipment and handling when such an important matter as lifeboat launching gear and its simplicity of operation can be readily understood. This sense of security no doubt adds to the passenger traffic of a vessel, and will more than pay the owners for the small extra expenditure of equipping their ships with such a simple and practical device.

A NEW LIFE PRESERVER.

The accompanying photograph shows an interesting comparison between the ordinary cork life preserver now in use and one of unique construction lately approved by the Board of Supervising Inspectors and about to be placed on the market

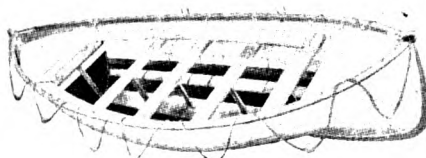


A-B-C LIFE BELT. CORK LIFE BELT.

by the Lane & De Groot Co., the manufacturers. This new life preserver, known as the A. B. C., resembles in general construction the older type. The manufacturers have, however, found a material which is about one-third lighter than cork, and have therefore been able to reduce the size of the lifebelt by a considerable extent and still maintain greater buoyancy than with the ordinary cork belt. This material is coated with a solution which entirely prevents the water or dampness of atmosphere penetrating the same, this advantage being perhaps the most important so far as maintenance goes, the covers and straps being thus prevented from destruction by mildew and rot and the life of the preserver considerably prolonged. The material used in the manufacture of the cover and straps is of an exceptionally high grade, the stitching also being of the best workmanship. The whole is most compact, efficient and satisfactory, and even if the first cost should be a little more than the ordinary life preserver now in use we sincerely

believe it will pay our readers to communicate with the Lane & De Groot Company, at 17 Battery Place, New York City, and further investigate the matter.

In conjunction our readers will notice a photograph of one of the Lane & De Groot metallic lifeboats, which have, by the way, been long considered the standard of their kind, particularly on the Atlantic Coast.



LANE AND DEGROOT LIFEBOAT.

A poorly-constructed lifeboat is a source of constant trouble, dissatisfaction, and eventual loss of life, whereas boats and rafts of superior build will last twice as long and need fewer repairs than those of inferior make. In case of accident or disaster the owner of a vessel equipped with a good make of lifeboats feels that he has done his utmost to safeguard the passengers and crew by placing an outfit on the vessel that is a real life-saving equipment a fact that the crew of the vessel can always appreciate.

INSTALLATIONS OF THE NICHOLSON SHIP LOG.

Messrs. Barrett & Lawrence, eastern agents of the Nicholson Ship Log Co., have recently closed a contract to equip the large steam yacht "Alcedo," owned by G. W. Childs Drexel, of Philadelphia, with the No. 1 Nicholson log. This log is without question the most scientific and perfect instrument of its kind yet produced. It is the only log on the market that will indicate the speed of the vessel, count the knots run, record the vessel's speed and be invaluable not only to the navigator but also the engineer. Indicator cards taken from the instrument installed on the scout cruiser Chester recently show considerable improvement in steady steaming conditions, whereas the line shown when the instrument was first installed was quite irregular; the improvement being due to the fact that the engine department was able to tell at a glance if the vessel was maintaining an even speed. Economy in coal consumption, resulting from a uniform speed being maintained, is a most important point and one that should receive the

closest attention and consideration of the ship owner.

Another feature which makes the Nicholson log invaluable is its extreme sensitiveness to varying depths of the water under the vessel. In other words, if the vessel is running at a given speed in deep water and suddenly runs into shoal water the racing of the water aft to the propeller will cause the instrument to suddenly show increased speed. This is a point that was developed on the U. S. S. Maine. The Nicholson ship log is now being installed on a number of vessels of the United States and other navies, and is in use in many vessels of the merchant marine.

JONES STOKERS IN LAKE VESSELS.

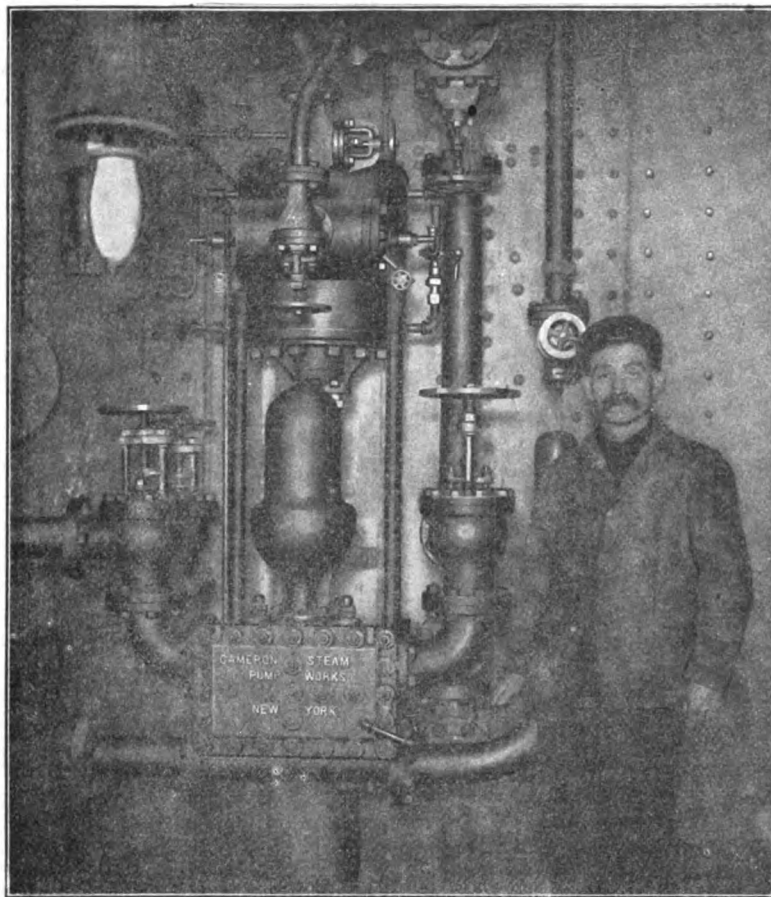
The Under-Feed Stoker Co. of America, Marquette building, Chicago, manufacturers of the Jones stoker, has sent us copies of two letters relating to marine installations of Jones stokers. One of these letters is from Mr. G. A. Tomlinson, Duluth, and covers quite completely the results shown by the operation of the six Jones stokers in the big steamer "James E. Davidson," during the season just closed. Views of this vessel and the stoker equipment are shown elsewhere in these pages.

The other letter referred to is from Mr. Francis T. Simmons, president, the commissioners of Lincoln park, Chicago. In his letter Mr. Simmons covers most thoroughly every feature of smoke abatement, economical operation, saving of labor, maintenance, and the general satisfaction derived from the installation of eight Jones stokers in the boilers of the big hydraulic dredge "Francis T. Simmons."

Both of the letters mentioned will, we understand, appear reproduced in identical form in separate bulletins descriptive of these installations and which will be ready for distribution within a few days. On account of the very emphatic statements made by the gentlemen mentioned we are certain that the bulletins will be of considerable interest to marine men in general.

The Nelson Valve Co. of Philadelphia have recently established two branch offices in the Middle West to keep pace with their rapidly expanding business; one of them in Detroit, at 822-23 Penobscot building, the other in Cleveland at 814-13 Perry-Payne building. John M. Bulkley has been appointed sales manager for the territory of Ohio and Michigan.

U. S. N.



CAMERON VERTICAL FEED PUMP IN BOILER ROOM OF U. S. S. NORTH CAROLINA.

be approached, the water valve chest containing all the valves also being covered by a single bonnet. In the steam valve movement there are three moving parts, consisting of two steel reversing valves operating in line with the steam pistons and one steam-driven balanced piston valve. No regulation of valve gear is possible or necessary, the parts, once built, remaining as constructed until worn out. These pumps are designed to work with the highest steam pressure, and in the case of those installed on the North Carolina and her sister ship Montana were subjected to 500 pounds per square inch at both steam and water ends. Each vessel is equipped with 27 Cameron pumps.

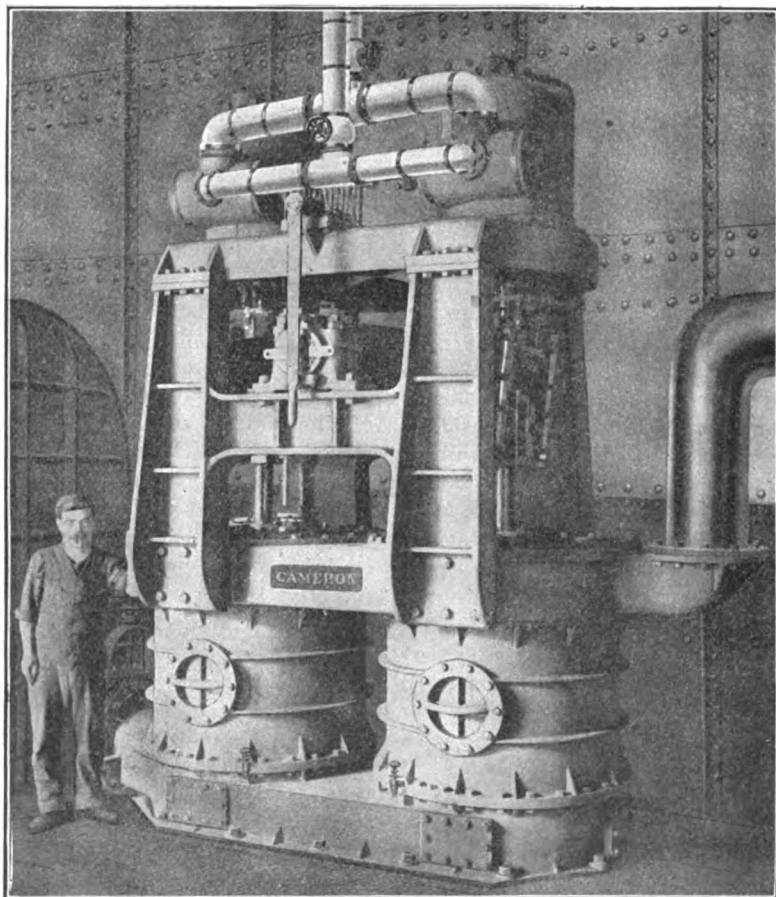
SPENCE PORTABLE ELECTRIC CONVEYORS.

In a recent communication Spence Mfg. Co., of St. Paul, say that the past year was a very satisfactory one for them in the sales of their portable electric conveyors, and from the many recent inquiries they have had for conveyors, not only from the steamship and railroad companies, but from manufacturing companies, it is manifest that a general interest is being taken in this time and labor-saving device.

PUMPS INSTALLED ON ARMORED CRUISERS NORTH CAROLINA AND MONTANA.

The pumps shown in the accompanying illustrations are part of the entire equipment of Cameron pumps installed on the United States armored cruiser North Carolina and built at the A. S. Cameron steam pump works, New York. The vertical twin-beam air pump has steam cylinders of 14 inch diameter, air cylinders of 35 inch diameter by 18-inch stroke. The high steam pressure valve-gear fitted to the pump consists in its entirety of three moving pieces to each cylinder, and is part of it, all parts of the gear being inside. This air pump embodies in its design and construction all the better features which are the result of practical experience and of the best obtainable knowledge of engineering practice in the building of this class of machine.

The vertical feed pump has many features which appeal to the marine engineer, not the least of which is its accessibility, a very important and vital requirement aboardship. By removing a single bonnet either reversing valve or the piston valve can



CAMERON VERTICAL TWIN-BEAM AIR PUMP ON U. S. S. NORTH CAROLINA.

700

BOAT HANDLING EQUIPMENT.

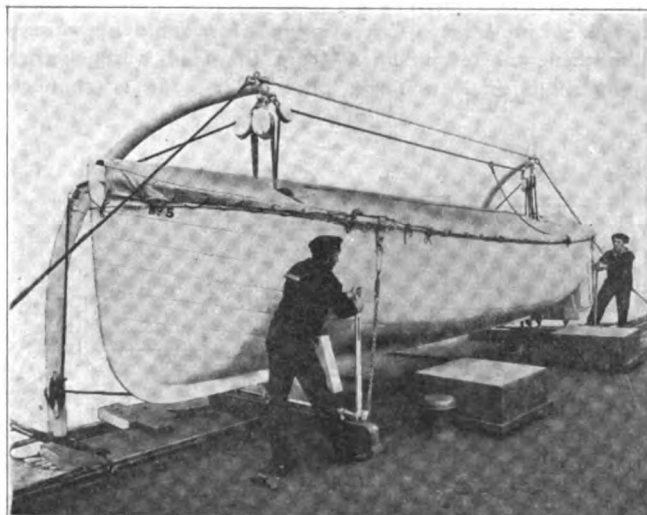
One of the most commendable marine inventions in lifesaving appliances placed on the market during the past year is the Ryan-Tanning boat handling device. Although only a few months in existence the company formed to place the apparatus before the shipping and shipbuilding interests has met with marked success, the device now being part of the boat-handling gear of several sea-going passenger steamers.

As will be seen on referring to the illustrations the apparatus consists in part of two rocking shafts attached to the lifeboat chocks and operated by levers. By the throwing over of the levers two rollers fitted on short arms attached to the rocking shafts are brought in contact with the keel of the boat, raising it about 1 in. and simultaneously lowering the chocks. The same movement releases the chain gripes, which are attached at the lower end to cams or hooks on the rocking shafts, and the boat is hanging in the davits ready to swing out.

In launching a lifeboat no previous training is necessary with this apparatus, which is extremely simple and rapid in operation. Several tests have recently been carried out on vessels installed with the apparatus, the first of which, on the Ward line

ship—with men in it—in 37 seconds. The entire operation was performed with only four men. During the same test three starboard lifeboats were swung out by three men, all ready for lowering, in 36 seconds. The tests were witnessed by several

suite 42, Alexander Young hotel, Honolulu, is in charge of Mr. J. P. Lynch, an experienced marine engineer and also an authority on boiler troubles in stationary plants. Bird Archer compounds were first introduced into Hawaii for use in connection with the

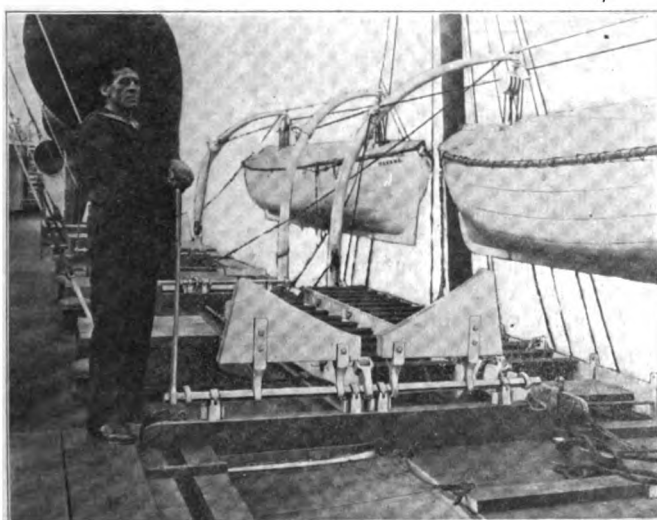


RYAN-TANNING BOAT HANDLING DEVICE.

prominent steamship owners and officials.

The apparatus can be installed on any vessel fitted with the ordinary chocks at a comparatively moderate price. The Boat Handling Gear Co.,

boilers on sugar plantations, a class of work which has also given them great prestige in Cuba. Mr. P. B. Bird, president of the Bird-Archer Co., who is now in Hawaii, writes that boiler feed waters on the Islands are so bad that if no preventive measures are employed it becomes necessary to remove scale by antiquated methods at least once every thirty days. The use of properly prepared compounds, therefore, effects a very noticeable saving in labor, fuel, repairs, etc.



RYAN-TANNING BOAT HANDLING DEVICE.

steamer Havana, gives a fair estimate of the time taken in getting a lifeboat from the chocks into the water. The boat, a 27-ft. lifeboat weighing over two tons, was unlashd, swung out, lowered 50 ft. to the water, tackles unhooked, guys and boat painter secured, boat cover cleared away and boat clear of the

95 Wall street, New York, are the owners.

BIRD-ARCHER COMPOUNDS.

The growing demand for Bird-Archer boiler compounds in Hawaii has made it necessary for the Bird-Archer Co. to open a branch office there. The new office, which is located in

The Dutch cruiser Gelderland seized the Venezuelan coast-guardship Alix off Puerto Cabello, on Saturday, Dec. 12. The Venezuelans offered no resistance and the Gelderland towed the Alix into Willemstad, Island of Curacao. The seizure of the Alix was in accordance with the plans of the Dutch government which issued orders to its three warships now in these waters to make a demonstration off the coast of Venezuela, and to capture any Venezuelan ships of war or guard vessels they might find.

Joseph Sloan, the Seattle boat builder, has closed a contract for building a fine large house boat for Maurice McMicken. The vessel is to be 92 ft. 6 in. over all and is 18 ft. beam and will be fitted with an 80-H. P. Globe engine to give her a speed of 10 miles per hour.

THE EBSEN GREASE EXTRACTOR.

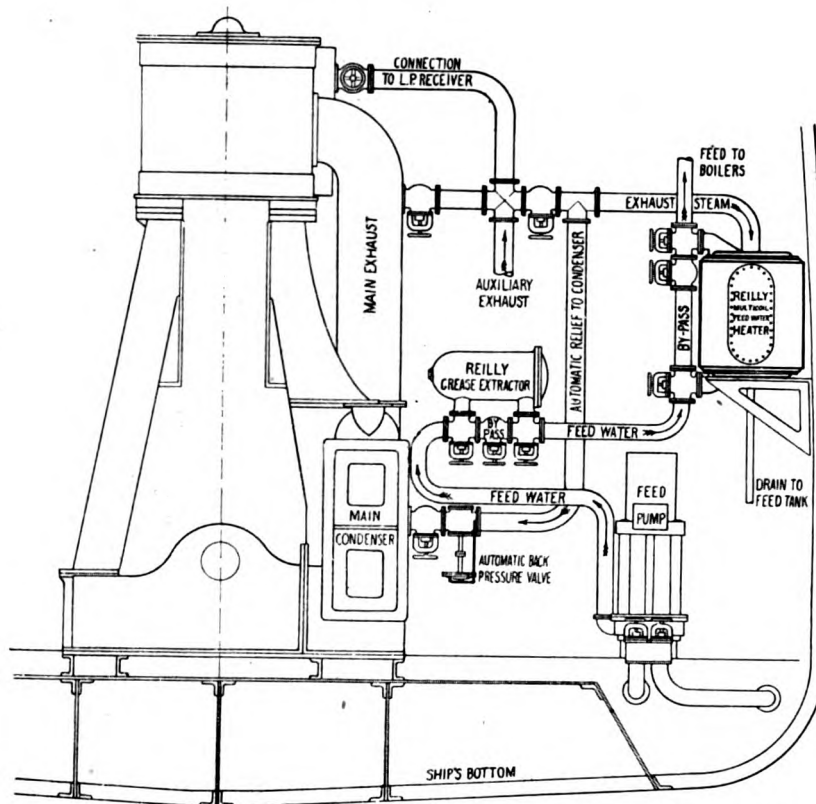
Among the many concerns engaged in the overhauling and fitting out of vessels in New York harbor and vicinity there are few better known than the James Reilly Repair & Supply Co. This concern, now the Griscom-Spencer Co., has a large and well equipped plant in Jersey City, adjacent to the principal ferry slips, repair and supply shops on New York

market a number of years and are well known in the marine field; among others may be mentioned the Reilly multicoil feed water heater, Quiggins patent evaporator and distiller and the Ebsen grease extractor, this latter being shown in the accompanying illustrations.

The Ebsen grease extractor is designed for removing grease and oil from the feed water before it enters the boilers. It is connected to the

closing the middle or by-pass valve the feed water enters the large chamber of the casing surrounding the cartridge, is forced through the filtering cloth to the center of the cartridge, then through center of the taper ring to the cross valve on the right hand side and thence to the boilers. When the by-pass valve is opened and the end cross valves are closed the feed water passes directly to the boilers, shutting off both chambers of the casing so that the cartridge can be removed by opening the door at the end.

The large inlet chamber is fitted with a pressure gage, which, when the cartridge is covered with a clean cloth, will show a pressure slightly above boiler pressure. As the cloth gradually becomes charged with grease the resistance will cause the gage to rise, and when it shows 10 or 12 pounds above boiler pressure will indicate that the cloth is foul and requires changing. As the cloths can be frequently washed there is comparatively little expense in the upkeep of this apparatus. There are many advantages in the Ebsen grease extractor. A spare cartridge and cloth



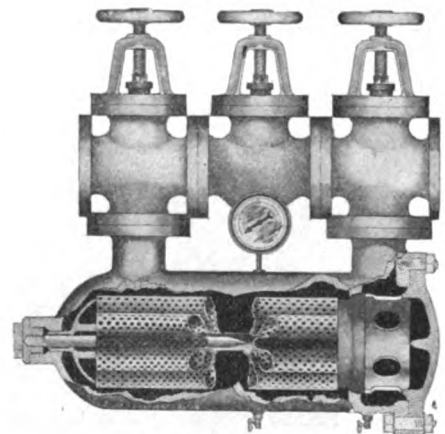
SECTION SHOWING LOCATION OF EBSEN PATENT GREASE EXTRACTOR.

river front and at Philadelphia. The shops on West street, New York, were established in 1867, and for nearly 25 years did practically all the repair work on the steamers of the American and Red Star lines and many foreign-going, coastwise and river steamers. During the entire time a large force of expert engineers and machinists have been retained, and the company has gained a worldwide reputation for rapid and skillful overhauling and repairs. Since the establishment of the New York shops they have been practically rebuilt and the plant considerably extended.

In addition to being at all times in a position to undertake marine engine and boiler repairs, the re-fitting of hulls, rigging and decks, and appliances for handling cargo, this company manufactures an extended line of engineering specialties, many of which have been on the

feed line on the delivery side of the main feed pump, and is usually bolted to the bulkhead near the pump. The apparatus consists of a cast iron or gun metal casing, divided into two compartments by a partition which has a taper hole in the center. The separating cartridge consists of a copper tube of special design and perforated over its entire surface with small holes. It is fitted at one end with a brass ring, which makes a watertight joint in the taper hole of the partition, the other end being fitted with a perforated casting which supports the cartridge centrally within the casing. The cartridge is wrapped with one or more turns of Turkish toweling, or a special filtering cloth.

The feed pump delivery is connected to the cross valve shown on the left hand side of the cut, and on opening the two end cross valves and



EBSEN GREASE EXTRACTOR.

can be always on hand, the changing of the cloth occupies only a few minutes, the design and operation is simple and the cost of maintenance practically nothing.

The German Admiralty, after three years' experiments with a type of submarine constructed at Kiel, has decided to go into the construction of this type of vessel extensively and orders have been placed at Dantzig for six submarines to be completed as soon as possible. In addition to the sum of \$2,500,000 to be included in the budget of 1909 for this purpose it is reported that \$3,750,000 will be asked for in 1910.

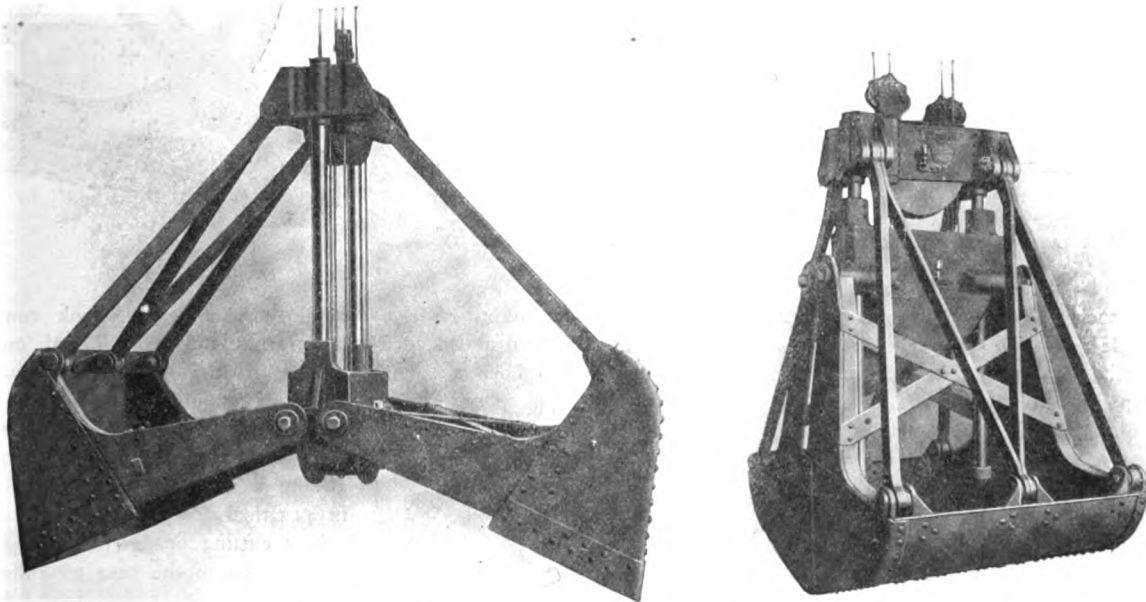
REILLY

SCRAPER CLAM-SHELL BUCKET FOR HANDLING PUMPED RIVER SAND.

The clam-shell bucket shown in the accompanying photographs is of the type known as the scraper clam shell and was recently built for the sand unloading plant of the Meranac Portland Cement & Material Co., of St. Louis, Mo., by the Hayward Co., of New York. This bucket is a remarkable example of the scraper type

or on the material in reference to the lead of ropes aloft, there is always a deflecting sheave automatically adjusting itself to the bend of the rope. Thus the operating ropes never come into contact with stationary surfaces in the bucket and all friction and cutting effects are eliminated. To further safeguard the ropes the lower center is made so that the sheaves and ropes travel through a bath of clear oil which tends to wash out

guides or slides are used in this bucket and their duty is comparatively light. These slides are hollow and round and hang perpendicularly from the upper center. They project through the lower center and serve to keep the two centers in alignment. The reach or opening of the bowl of this bucket is very long and the mouthpieces comparatively wide, giving it the ability to fill in hard shallow material and to clean up large areas with few



HAYWARD SCRAPER CLAMSHELL BUCKET IN OPEN AND CLOSED POSITIONS.

and is unique in construction, its design being the result of many years experience in building automatic digging and conveying buckets.

The closing mechanism is of the familiar rope and sheave tackle device in which the closing rope is reeved through a number of sheaves disposed in the upper and lower centers of the bucket and dead ended at the trolley carriage of the hoisting tower. The holding line is passed under a single sheave in the upper center and also dead ended at the trolley carriage. This arrangement permits the bucket to be hoisted and trolleyed at the same time without any compensating mechanism on the operating lines. The advantage of this method of operation would be lost, however, by the increased wear and tear on the ropes were it not for the extreme care taken in providing against this wear in the bucket itself.

The sheaves are unusually large and so arranged that there is no side friction on the rope. A novel form of guide sheaves is so arranged on the upper center that no matter what position the bucket is landed in

the grit and sand which they may pick up. A clean out is provided at this point for removing the sediment at the bottom of the lower center.

The connecting rods and bowl are made in the usual style employed in Hayward buckets,—of forged and flanged steel securely braced against lateral shocks and movement. All rivets are countersunk in the bowl and all edges are chamfered or flush inside of same so that the bowl is absolutely free of all obstructions. The mouth of the bowl is entirely shrouded and protected by a heavy mouthpiece or cutting edge. The upper and lower centers are made of steel casting and arranged to receive a light steel sheave frame which contains the sheaves and protects the castings from wear. All hinge points throughout the bucket are provided with removable bronze bushings and so arranged that the bronze receives the wear in every case and all pins and bolts are preserved in good shape.

Oiling provisions are made at all points, the sheaves being supplied through the pins, which are of large diameter and contain oil chambers connected to cups at their ends. Only two

operations. Provision has been made for every condition of service and wear that the hard proposition of digging pumped river sand at high speed can present.

NEW FREIGHT BOAT REACHES PASCO ON THE UPPER CO- LUMBIA RIVER.

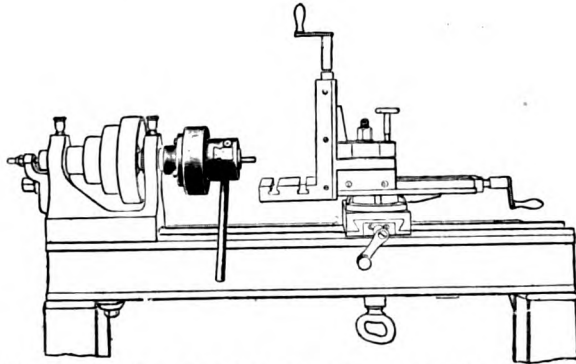
The Pasco, Wash., Commercial Club gave an elaborate banquet Monday evening, Dec. 28, in honor of the arrival of the freight steamer Inland Empire and the United States dredge Umatilla. The banquet was a welcome to the Open River Transportation Co. which has commenced freight service on the upper Columbia river from Celilo Falls to Pasco. The cargo of the Inland Empire amounted to 150 tons; heretofore the largest cargo ever carried on the upper Columbia was 40 tons. This service inaugurated a new era in the navigation of the upper Columbia river. The crew of the Inland Empire includes Capt. Clarence Kellogg; Charles Spinner, first mate, and Thomas Tackleberry, chief engineer.

A municipal ferry line from New York to Stapleton, Staten Island, will be put into operation within a few weeks.

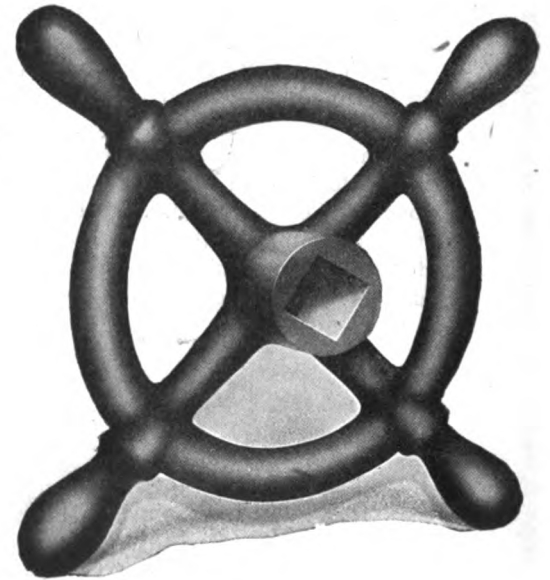
MACHINE TOOL ATTACHMENT FOR BORING ANGULAR HOLES.

The convenience of square holes and of square counter-sinks in certain classes of construction has long since directed the attention of inventors to the problem

it will be seen that when one side of the shank is either rolling or sliding upon one side of the square guide, the opposite edge of the shank will move in a straight line. This holds true for all positions of the shank except for a very small distance at the corners, and it is



SHOWING APPARATUS ATTACHED TO HEAD OF AN ORDINARY LATHE.



of producing such holes in wood, metal, etc., at a single operation. We are now able to describe a device by means of which it is possible to bore such holes upon any ordinary lathe, milling machine, or drill press at a rate nearly equal to the speed at which ordinary round holes can be drilled with a flat or twist drill.

Of course, it goes without saying that for a solid tool to bore anything more than round holes it must have something more than a purely rotary motion about a fixed axis, and the interest of the present appliance consists in the mechanism by which the proper motion is obtained.

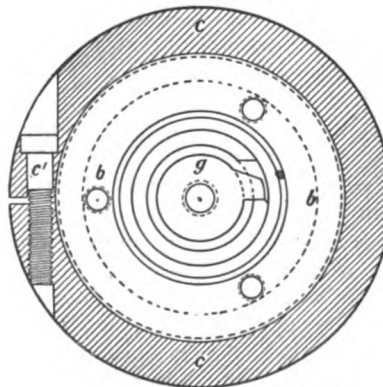
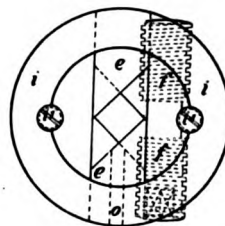
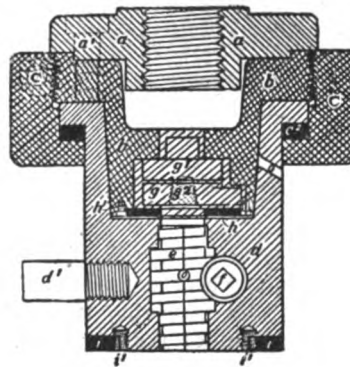
This is a special chuck, illustrated herewith, consisting essentially of three parts; first, a driving part, which is screwed to the spindle of the machine upon which the work is done; second, a stationary part, which may either ride upon the first part, by means of a bearing, or which may be fastened directly to the frame of the machine, and third, a part into which the shank of the drill is screwed and which is caused to rotate by the first part, but which is also free to move sidewise to a certain extent. This sidewise motion is limited by a guide or matrix in the second or stationary part, the exact amount and form of the motion being determined by the shape of this guide and by the shape of the shank of the tool.

The tool for boring square holes has a three-cornered shank, the sides being segments of circles struck from the opposite angles or edges as centers, and the radius of all three circles being the same and equal to one side of the square guide in which the shank turns about. By reference to the diagram shown herewith

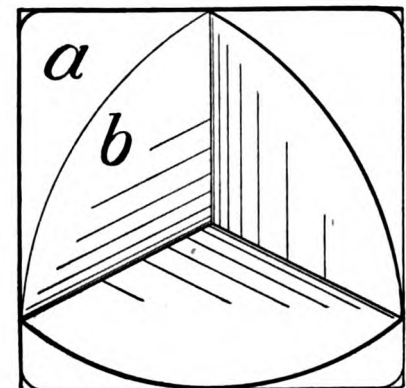
found that the tool here described bores a square hole with slightly rounded corners. If it is desired to bore a square hole with sharp corners, a special tool is

employed having a shank considerably larger than the cutting head, one of the corners of the shank being rounded instead of angular. The exact form of this shank has been worked out empirically and standards have been made for all the sizes of holes likely to be needed in practical work.

The cutting edges of the tool are on the end, as in the case of either flat or



DETAILS OF CONSTRUCTION.



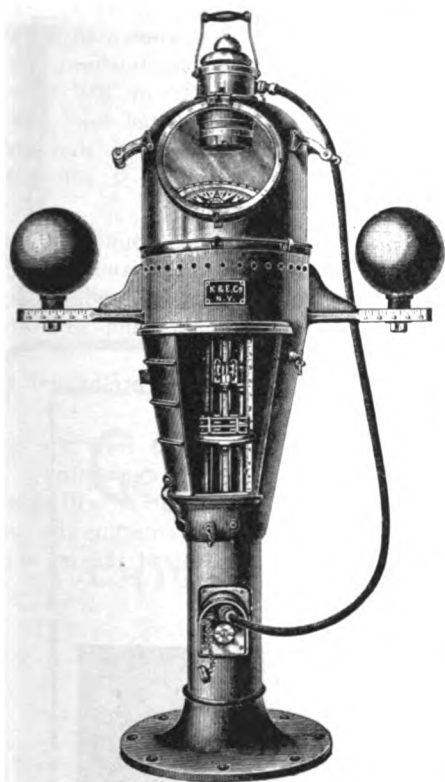
twist drills. To do commercial work with this device, it is necessary to have as many different drills as there are sizes of holes to be bored, but the matrix or guide in the stationary part of the chuck can be adjusted to a considerable range of sizes, making only one chuck necessary. Where it is desirable to bore triangular, pentagonal or hexagonal holes or other forms of holes, a corresponding tool and matrix is supplied. It is found, however, that the square hole is of the most general utility.

A large number of these chucks, practically all of which are of the square hole type have been sold in Germany to such

firms as Friedrich Krupp, Siemens & Halske, etc. The device is being introduced into this country by the Radical Angular Drill Co., who have fitted up a show room on the second floor of the Engineering building, 114 Liberty street, New York City, where they have the device arranged for demonstration on a milling machine of the ordinary type.

COMPENSATING BINNACLE.

The binnacle shown in the accompanying illustration is manufactured by Keuffel & Esser, nautical instrument makers, New York City, and represents the finest type of nautical instrument in the market,—the compensating binnacle. This instrument is furnished by the makers to the U. S. Navy, and is the recognized standard binnacle of the service. The stand,



COMPENSATING BINNACLE.

including the graduated arms for the 7 in. spheres, is an integral brass casting. The hood is spun of stout polished brass and has a hinged plate glass front and a sliding door opposite the front glass. The light is reflected on to the compass dial by means of a prism.

The semi-circular corrector magnets are mounted on trays which are raised and lowered independently of each other by a screw moved by bevel gears; which method is simple and insures against disturbance of their adjustment. The trays are so constructed that they will pass one another in any position, their travel limit being 12 in.

The semi-circular corrector magnets are held in their receptacles by a device which holds them safely and still permits of easy access. The long heeling magnet is suspended in its tube by a chain passing over a sheave in the compass chamber. The door of the magnet chamber slides around the body of the stand, so that it is not liable to injury when opened nor to be in the way when making adjustments. It can be locked when closed.

NEW STEEL BARGES FOR THE LEHIGH VALLEY.

The Lehigh Valley Railroad Co. has just launched the first of a number of steel coal barges, which are building for service in the transportation of coal from the storage yards

heads in bow and stern, also three steel bulkheads for dividing cargo,—boat being divided into four bins, enabling shipments of four different kinds of coal in the same barge. It is provided with a donkey boiler, steam capstan, Baldt anchors, and large anchor chains of ample length.

It has three masts 76 feet in length, provided with three "leg of mutton" sails, enabling it to proceed under its own sail in case it breaks adrift from the tow boat. It is also provided with a modern lifeboat, in addition to a dory used as a work-boat.

The captain's quarters, located on the main deck, are finished in polished ash. The quarters of the crew and the pilot house are on the upper deck,



STEEL BARGE FOR THE LEHIGH VALLEY RAILROAD CO.

at Perth Amboy to points along the eastern coast.

This new steel barge inaugurates an advancement in water transportation of coal, wooden barges being used almost universally heretofore. The steel barge carries a larger load on much less draught than the old wooden barge and will tow much easier.

The dimensions of the steel barge just launched, which corresponds exactly with other barges being built for the Lehigh Valley railroad, are:

Length over all.....	200 ft.
Breadth over all.....	35 ft.
Depth of hold, lowest point of sheer	17 ft. 6 in.
Draught, loaded, 1,620 tons.....	14 ft. 6 in.
Draught, loaded, 1,900 tons.....	17 ft.

It is provided with watertight bulk-

making the barge one of the most complete now employed on the Atlantic coast in the coal trade.

It is the recommendation of Surgeon General Rixey that the hospital ship Relief be kept in Olongapo as a hospital ship after she has been repaired of the injuries sustained in her recent experience in a typhoon. It is claimed that the Relief is unseaworthy and as there is no hospital at Olongapo it is possible that the famous hospital ship will soon cease to be a fleet auxiliary. It is expected that Congress will some time provide for the construction of two suitable hospital ships to comply with the recommendations which have been made by Surgeon General Rixey for the past two years.

OIL VS. COAL AS A MARINE FUEL.

BY G. P. BLACKISTON.

The use of oil as a fuel for ships is rapidly increasing in popularity. This is due, to a great degree, to its noticeable economy, not only in the

ibly lower, owing to the fact that the furnace doors are never opened and hot cinders and ashes are entirely absent.

A very interesting comparison of the advantages between oil and coal can readily be seen by the following

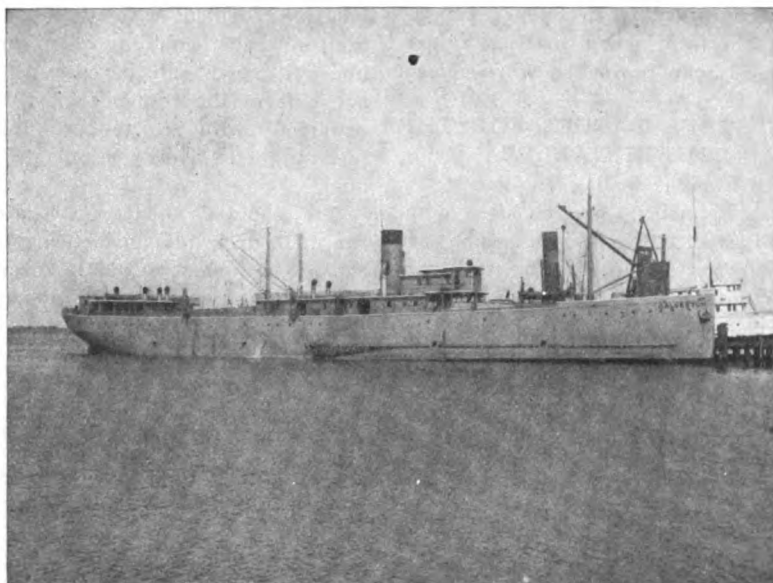
is a mixture of a number of hydrocarbons, all having the same component parts and their differences being entirely due to the varying proportions of these constituents. Each of them makes a very good fuel under certain conditions, but to a misunderstanding of these conditions is due much of the adverse criticism of the use of oil as a fuel that has happened of recent years; and to an appreciation of these conditions and the use of proper heating and burning appliances will be due the success that this class of fuel will achieve.

1. The oil used must be of sufficiently high fire test. If this condition is observed it will dispose entirely of the objection on the score of safety frequently urged against this fuel. In fact, oil with a fire test of say 180° or 200° Fahr. is as safe as coal, which has been known to ignite from spontaneous combustion. Oil with a fire test of 250° or 300° Fahr. may be stirred with a red hot poker without being ignited, or a shovelful of hot coals thrown into it will sink and be extinguished.

2. The oil must be supplied to the burners under a sufficient and uniform pressure; this is best accomplished by means of small pumps and pressure chambers.

3. The oil should be pre-heated to facilitate atomization.

4. The burner should feed the oil in a finely atomized condition; a properly constructed burner will show no dark stream of oil entering the furnace from its tip; instead the oil will



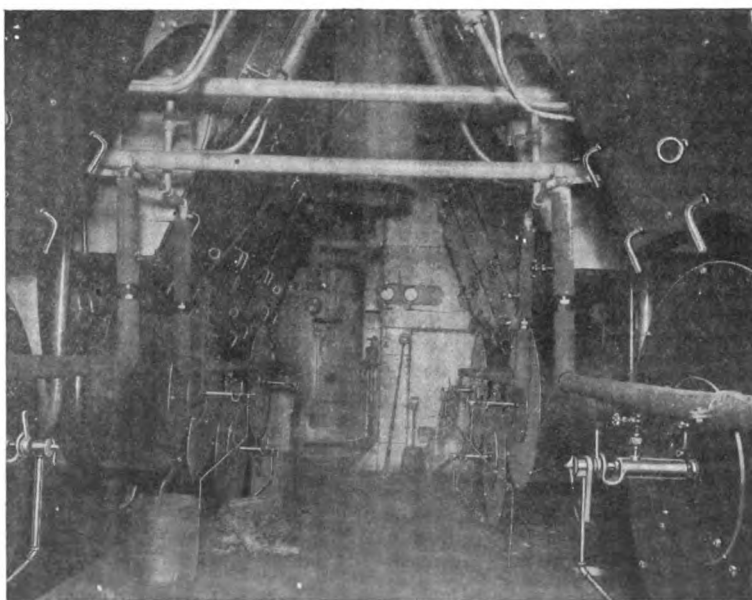
THE OIL BURNING DREDGE GALVESTON.

actual cost of the fuel itself but in labor for handling and storage space. From three to three and one-half barrels of oil do the work of one ton of best quality coal, and from this can be quickly figured the saving in favor of oil. As three and one-half barrels of oil weigh about 1,000 lb., it can readily be seen that oil fuel for a trip weighs only half as much as would coal. The water ballast bottoms may be used for storing the oil (sea water being pumped into each compartment where the oil has been taken out), so that the space ordinarily required for coal may be used for cargo, increasing the carrying capacity of the ship. As the oil is fed mechanically by pumps to the boiler, about one-third of the number of stokers are required, making a large saving in wages, board and accommodations. Due to the fact that the oil can be loaded in about one-third the time required for the coal, more trips can be made. The speed is also increased about 20 per cent by oil fuel. Combined with these pronounced advantages a perfect control of the fire is had at all times. Accordingly the fire can be changed almost instantly from a low to a most intense heat. The fire is steady and regular, the steam pressure therefore being always constant; while the temperature of the stoke hole is percept-

data taken from the log of steamship Venus, plying between New Orleans and Simon, Costa Rica, C. A.:

Coal used, 24 hours.....	30 tons.
Oil used, 24 hours.....	96 bbl.
Distance traveled in round trip..	2,600 miles.
Knots per hour with coal.....	9
Knots per hour with oil.....	11 3/4
Oil pressure at burners.....	33 lb.
Total oil used on trip.....	1,000 bbl.
I. H. P.....	950.

Looking closer into the subject we find that crude petroleum or fuel oil



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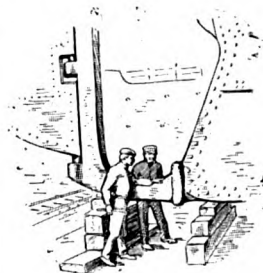
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porary Patch.

BY THIS PROCESS, steel sections of any size may be welded IN PLACE. All appliances are light and portable and may be brought to the job. Stern-posts, rudder-posts and stern frames of steamships may be quickly repaired without dismantling the vessel, THUS KEEPING THE VESSEL IN DRY DOCK ONLY A FEW DAYS AND SAVING HUNDREDS OF DOLLARS IN THE EXPENSE OF THE REPAIR. In the same way important repairs may be made to crank shafts, gear wheels and other broken steel sections.

Write for Pamphlet No. 18-E.

Goldschmidt Thermit Co.
90 West Street, New York.

432-436 Folsom Street, San Francisco.
103 Richmond Street W., Toronto, Ont.

emerge from it in an almost imperceptible spray or vapor.

5. The steam should be super-heated before going to the burner.

6. Just the right proportion of air should be admitted to the fire box or combustion chamber to completely burn the fuel. Both experience and scientific experiment have laid it down as a general rule, that an excess over the proper amount of air is not only useless but actually exercises a cooling effect on the combustion chamber. In the practicability of admitting just the right amount, lies one of the advantages of liquid over solid fuel.

7. The combination heater and pressure chamber should be fitted with a proper arrangement of relief valves to permit an excess of oil to return to the tanks.

The United States government several years ago became very much interested in this fuel and after making a thorough study of the subject decided to install an oil fuel system in the gigantic hydraulic dredge, General C. B. Comstock, built for Gulf of Mexico service.

The Tate-Jones Co. of Pittsburg were awarded the contract due to their peculiar burner which assured maximum results.

So successful was this that the same style equipment was specified and installed in the new United States army hydraulic dredge, Galveston. This monster with her 2,000-I. H. P. engines was built by the Maryland Steel Co. and is to be placed on duty in the Galveston harbor.

With the increase of production in crude oil this method of heating will rapidly advance, due to its manifold advantages over coal or other fuels.

TRADE NOTES.

The C. F. Harms Co., 140 Broad street, New York, have advertised their lighterage and towage business by a nautical calendar, giving morning and evening high water at Sandy Hook and at Governor's Island.

The Atlantic Works, Inc., Twenty-eighth street and Gray's Ferry road, Philadelphia, shipped one of their B-17 adjustable bevel band saw machines to the Seaford Marine Railway Co., Inc., Seaford, Del., last week.

The single steamship launched was the Belfast, of 2,076 tons, which was built for the Eastern Steamship Co. One of the two six-masted schooners was the Edward B. Winslow, 3,423 tons, the largest wooden schooner afloat.

Edward Mehl of Erie, Pa., has

sent out a calendar, the pictorial part of which is a reproduction of a photograph of the Philadelphia & Erie ore dock at Erie in 1890. It is very interesting. Nearly all the boats lined up at the dock are wooden schooners.

Edward Smith & Co., varnish makers, have removed their main office to their works at West avenue, Sixth and Seventh streets, Long Island City, five minutes from the East Thirty-fourth street ferry.

The Vacuum Oil Co., which is the marine end of the Standard Oil Co., has just issued a calendar advertising marine oils. The pictorial part of this calendar is especially fetching as showing some of the infinite varieties of woman.

The Lavigne Mfg. Co., Detroit, Mich., have issued a catalog descriptive of their quick-opening hot water radiator valves. The catalog represents that these valves are more efficient, more durable and more easily operated than valves of any other manufacture.

The Atlantic Works, Inc., Twenty-eighth street and Gray's Ferry road, Philadelphia, recently received an order from the Perine Machinery Co., Seattle, Wash., for one of their B-17 adjustable bevel band saw machines which they sold to Messrs. D. Rohlf's Sons & Co., boat builders, Seattle.

Elisha Webb & Sons Co., 136 South Front street, Philadelphia, Pa., ship chandlers and grocers, have sent out a calendar for the new year, the decorative part of which is a wreath of holly reproduced in the three-color process. While very simple it makes a most attractive calendar. The calendar is nautical, giving the changes of the moon and the rise of the tides.

During the year in Maine there have been built, or are now building or definitely planned, one steamship, 21 schooners, two tugs and a barge, with a total tonnage of 20,000. Of the schooners there were nine four-masted, six three-masted, two six-masted, and one five-master. The three-masted coasting schooners were also constructed.

ITEMS OF GENERAL INTEREST.

The Westinghouse Diary for 1909 is just out. This is the fifth edition of the Diary which has become one of the most popular memorandum books issued by any industrial house. More information of interest to engineers and users of power apparatus is published in the 1909 edition than in any of the former editions. In addition to the usual interest calculations, approximate values of foreign coins,

area and population of territories, rates of domestic and foreign postage, population of leading cities, heating value of liquid fuels, strength of materials, weights and measures, metric conversion table, there is also included the following subjects: High Pressure Steam Turbine, Leblanc Condenser, Low Pressure Steam Turbine, Mechanical Stoker, Mercury Vapor Lamps, Meter Testing, Storage Battery, Single Phase Railway Systems, Tungsten Lamps, Turbo Pumps and Blowers, Westinghouse Nernst Lamps.

The British government has recently made arrangements to place orders on the Clyde for work aggregating one and a half million pounds. It is believed that the work is to consist of the cruisers of the Boadicea type.

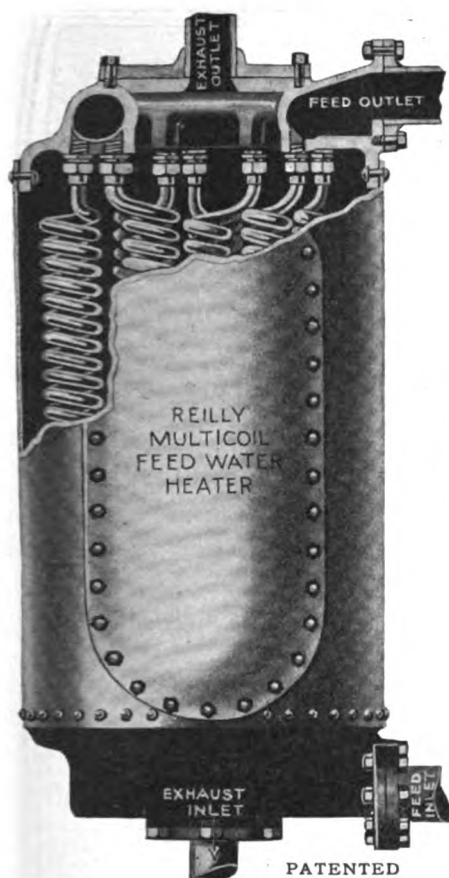
A. C. Brown & Sons, Tottenville, S. I., N. Y., have been awarded contract for the construction of the hull of a tug by the Packard Dredging Co. of New York City. She is to be 100 ft. long, 25 ft. beam and 11 ft. deep.

George A. Gilchrist, Belfast, Me., is reported as having a contract for the construction of a four-masted schooner to take the place of the Frank Barnett, recently burned at sea. She was owned by the George McQueston Co., of Boston, Mass.

A two-mile cutter race between crews from the armored cruisers Montana and North Carolina, at Norfolk recently, resulted in a victory for the Montana men. Nearly \$3,000 changed hands among the enlisted men aboard the vessels as the result of wagers on the race.

The California Shipping Co., of San Francisco, one of the largest owners of American sailing tonnage, has announced that it will retire from business and dispose of its properties. The company is at present headed by Capt. Cyrus Ryder, who succeeded Mr. William Mighell, the latter of whom was for many years president and manager. Sixteen vessels are now owned by this company.

The representative of the New York Terminal Co., who has been in charge of the affairs of the Brooklyn Ferry Co.'s Williamsburgh ferries, has given notice to the city of New York that the only terms on which his company would resume the operation of the boats were indemnification against loss of money by the operation and payment of interest accruing on the bonded debt during such operation. City Comptroller Metz states that there is nothing left for the city to do but to shoulder the loss as the ferries must be kept running.



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the Reilly Multicoil
Heater for more
than a few
moments**

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Formerly the James Reilly
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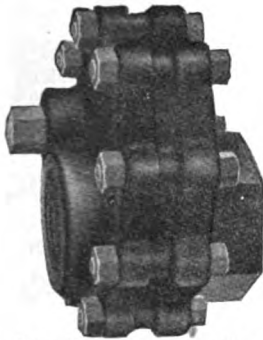
The Star indicates alternate insertions, the Dagger once a month.

Acheson Graphite Co.....	115	†Crescent Machine Co.....	33	Jenkins Bros.....	116	Pittsburg Coal Co.....	101
Almy Water Tube Boiler Co..	90	Curr, Robert	113	Jenkins, Russell & Eichelber-	112	*Pittsburg Forge & Iron Co...	29
American Automatic Oil Filter		Curtiss & Co.....	104	ger		Polson Iron Works, Ltd....	11
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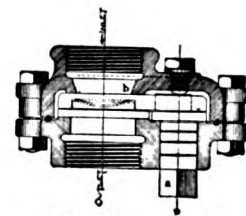
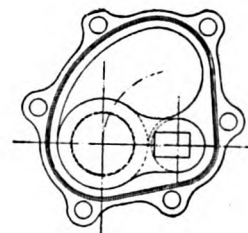
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